YLHA PLUS 5 to 27 R-410A

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Technical Infomation

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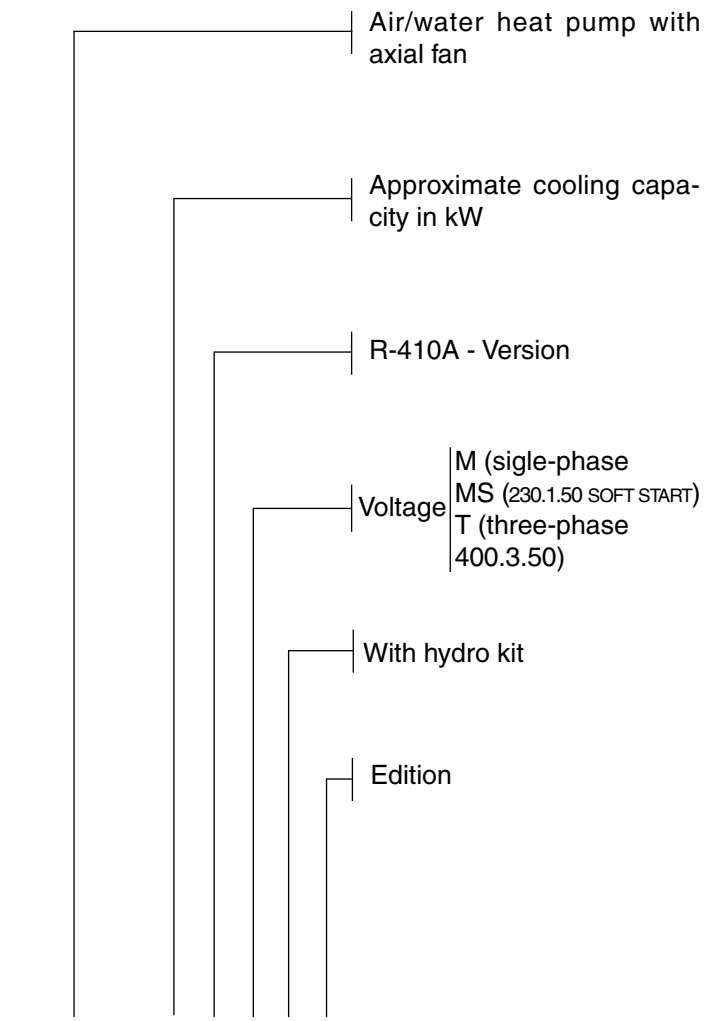
General Information

Nomenclature



General description

The YLHA PLUS 5 to 27 units are high-performance air-water heat pumps using R-410A ecological refrigerant.
These units are designed for air conditioning or industrial applications that require cold or hot water. They are silent and compact units, equipped with axial fans, and can be installed directly outdoors. They are available in two versions: with and without a hydro kit. Buffer tanks are available for installations that require a larger water volume.
The control system of these units is a specially programmed electronic controller to be used on air-water heat pumps.
Easy and safe to use, this control system precision-controls the water return temperature of the installation, carries out defrost cycles, modulates fan speeds and controls the compressor, pump and auxiliary electric heater start-ups. By reading the control probes and safety elements, the controller protects the entire equipment against any malfunctions. The system allows connecting the unit to a standard RS485 monitoring network. For further information, please see Operating Instructions.
The YLHA PLUS 5 to 27 units are made of proven quality components and manufactured in compliance with standards in force (ISO 9001 certification).

Models available and capacities

Model	YLHA PLUS-5M	YLHA PLUS-7M	YLHA PLUS-9M	YLHA PLUS-9T	YLHA PLUS-12M
Cooling capacity (kW)	5.4	7.10	8.7	8.7	11.75
Heating capacity (kW)	6.30	7.16	9.52	9.52	12.25

Model	YLHA PLUS-12T	YLHA PLUS-15	YLHA PLUS-20	YLHA PLUS-27
Cooling capacity (kW)	12	13.8	19.4	25.80
Heating capacity (kW)	12.4	16.1	20.9	27.50

Cooling capacities in kW for 12/7° C entering/leaving water temperature, and 35° C ambient temperature.

Heating capacities in kW for 40/45° C entering/leaving water temperature, and 7° C ambient temperature.

Features and advantages

Features	Advantages
R-410A refrigerant	Does not harm the ozone layer.
Minimum dimensions	Minimum footprint.
Low height and weight	Space for installing on terraces.
Factory tested equipment	Operating quality control.
Accessibility	Easy maintenance.
Main switch	Operator safety.
Microprocessor for control and alarms	Easy and safe operation.
Manufactured to ISO 9001	High quality level.
Variable speed fan	Low noise level and condensation control.
Possibility of eliminating the buffer tank	For installations with low water volume.
Communications connection	Ideal for building management.

Dynamic set point and suppression of buffer tank

The YLHA PLUS 5 to 27 control system has *Dynamic Set Point and Suppression of Buffer Tank functions*.

Dynamic Set Point. Modifies water temperature control set point in accordance with the outdoor temperature. The purpose of this is to avoid excessive an temperature differential between the indoor and outdoor air conditioned areas. Should this differential exist and be excessive, it could cause discomfort and thermal shock that could be detrimental to the health of the users entering and leaving this area. On the other hand, this function, that increases the set point in the winter cycle and lowers it in the summer cycle, contributes considerably to system energy savings.

Suppression of Buffer Tank. This function increases the temperature differential that, added to the control set point, controls the on/off cycles of the compressor when the unit is operating at a low charge. To achieve this, the reference point used is the duration of the compressor operating cycles. In this way, when the water temperature falls quickly, it delays the compressor off cycle by simulating the buffer tank operation, thus avoiding excessive on/off cycles of the unit. Although this function decreases water temperature control precision slightly, it eliminates the need to use the buffer tank.

Since the units chat include SOFT START allow a greater number of start-ups per hour (15), it is not necessary or possible to program the buffer tank suppression.

Technical Specifications

These units are supplied completely factory-assembled and with all refrigerant tubing and wiring ready for installation at job site. After installation, these units must go through an operational test with water. Refrigerant leaks will also be checked during this process.

Sheeting casing

The units are made of galvanized steel sheeting and anticorrosion nuts and bolts. Panels can be removed for accessing internal components. The casing parts are painted with white RAL9001 oven-baked polymerized enamel.

Compressor

Hermetic Scroll compressors mounted on antivibratory supports are used. These compressors are equipped with electronic modules that protect them against high operating temperatures. The sump heater (20 and 27 units only) operates only when the compressor is inoperative.

Indoor heat exchanger

Comprises a stainless steel plate exchanger, adequately insulated by a layer of closed-cell elastomer foam. The refrigerant side of said exchanger accepts an operating pressure of 52 bar, whereas the water side accepts 10 bar. When the unit includes a hydro kit, maximum admissible pressure on the water side is 6 bar (adjustment of the relief valve).

Outdoor heat exchanger

Made up of notched aluminium blue fin coils and grooved copper tubing mechanically expanded within the fin assembly.

Fans

Of the axial and low sound level type. Equipped with single-phase motors with IP54 protection. These motors allow speed control by means of a phase cut-out shifter controlled by the unit controller. This allows unit operation at low ambient temperatures (-10°C).

An optional low ambient temperature kit (pressure sensor) can reach -18°C. On heat pumps, the fan will remain inoperative during defrosts.

Electric and control panel

Located inside the unit, and with IP44 protection. The operating and control components are factory mounted, wired and tested. This control panel is equipped with an external locking isolator that cuts power supply off. Inside we find the contactors for the compressor and the pump, the transformer, magneto-thermal protector, speed control, connecting strip and the keyboard-display with the unit controls.

Control keyboard-display

This device is accessible through an external leak-tight plastic cover. This is an easy-to-use control with three access levels: Direct, User (password) and Factory (password). For further information, please see Operating Instructions.

Cooling circuit

Includes Schrader valves on the high and low sides, high and low pressure switches, filter-dryer, two expansion restrictors (YLHA PLUS 5 to 15), two expansion valves and liquid sight glass (YLHA PLUS 20 to 27), service valves for isolating the condensing unit (pump down) (YLHA PLUS 27), liquid tank, 4-way valve (energized in summer cycle) and check valves (YLHA PLUS 20 to 27). The down tubing is coated with closed-cell elastomer.

Hydro kit (pack)

These units include a pack assembled with the components of a hydro kit. This assembly is located within the unit frame and does not increase the footprint of same. It includes the following components: Centrifugal pump, expansion vessel charged with nitrogen at 1.5 bar, relief valve set to 6 bar, flow switch, air bleed valve and drain connection. It also includes a mesh filter for the water circuit. This filter is supplied loose for installation at the most convenient point.

Protecting grid

Supplied as a standard element. Stainless steel mesh with 1 mm. diameter perforations.

The guarantee of the unit will not be void if a water filter has not been installed.

Accessories and options

Protecting grid

To protect the coils from possible impacts. Made of steel rods and painted with oven baked polymerized white enamel (RAL9001).

Remote control unit

Wall-mounted remote control unit with keyboard for cool/heat and ON/OFF functions. Includes power supply, alarm and cool/heat LEDs. Maximum cable length: 50 m.

Remote terminal

For total access and control of the system by means of the display and keys. Allows selecting cool, heat and off functions.

Can also modify operating parameters and monitor the system. Can be installed at a maximum distance of 1040 m.

BMS connections
By means of a serial board, it is possible to connect the system to a standard RS485 monitoring network.

Low ambient temperature kit (YLHA PLUS 5 to 15)
Includes a pressure transducer for controlling condensing pressure at low ambient temperature (-18°C).
Standard on models 20 and 27.

High pressure fans

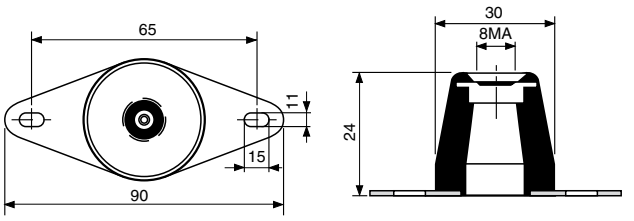
Copper fin coils

Buffer tank

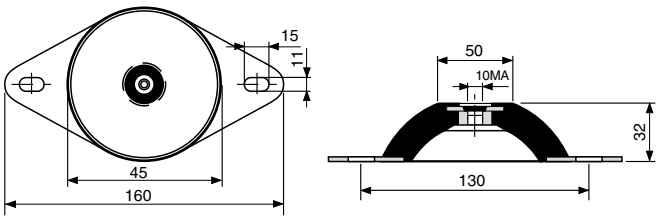
Soft Start

Antivibratory supports
Whenever it is necessary to decrease to a maximum vibrations and noise produced by the unit, a set of rubber antivibratory supports can be used. These should be installed between the supporting chassis of the unit and the base or floor where same is to be located. This base must be solid and dimensioned in accordance with the load it is to withstand. Use 8/10MA bolts to fasten the supports to the base of the chassis. The antivibratory support accessory includes 4 parts. These supports should be spread out and fastened to the drilled holes at the base of the chiller, the location of which is detailed in the General Dimensions section.

Units 5 ÷ 15



Units 20 and 27

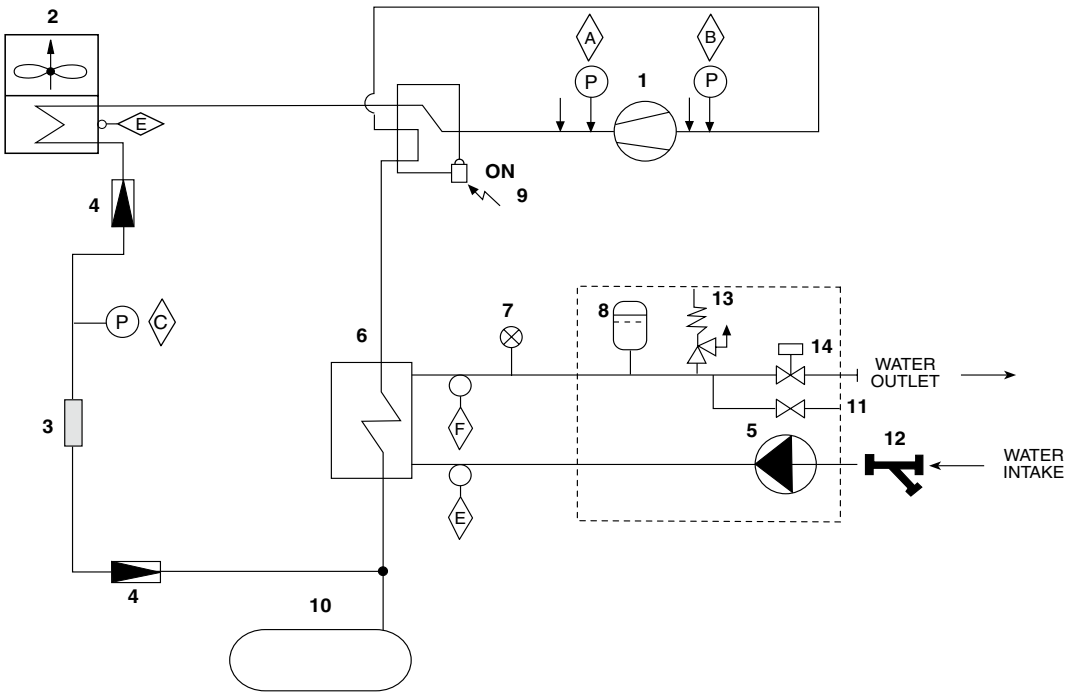


Physical data, heat pump units

Characteristics		YLHA-5 MC	YLHA-7 MC	YLHA-9 MC	YLHA-12 MC	YLHA-9 TC	YLHA-12 TC	YLHA-15 TC	YLHA-20 TC	YLHA-27 TC
Cooling capacity	kW	5.4	7.10	8.7	11.75	8.7	12	13.8	19.4	25.8
Heating capacity	kW	6.3	7.16	9.52	12.25	9.52	12.4	16.1	20.9	27.5
Power supply	V/ph/Hz	230.1.50				400.3.50				
Comp. consumption in cooling	kW	1.77	2.41	3.29	3.90	3.29	3.80	5.13	6.71	8.47
Comp. consumption in heating	kW	1.76	2.30	2.98	3.55	2.98	3.77	4.81	6.06	7.89
Comp. amperage in cooling	A	8.4	11.7	16.3	20.2	6	6.36	8.7	11.7	15.1
Comp. amperage in heating	A	8.1	11.2	14.8	18.7	5.8	6.38	8.2	10.8	14.3
EER/COP nominal conditions		2.82/3.32	2.75/2.90	2.51/3.02	2.75/3.12	2.51/3.02	2.88/3	2.52/3.12	2.75/3.25	2.90/3.30
COP air 7/6 - water 30/35		3.78	3.48	3.88	4.01	3.88	3.86	4	3.96	4.03
No. of compressors		1								
Compressor type		SCROLL								
Oil charge in litres	l	1.1	1.25		1.24	1.25	1.24	1.89	2.51	3.25
Oil type		POLYOL ESTER OIL								
Evaporating unit type		PLATES								
Nominal flow	l/h	930	1 220	1 495	2 020	1 495	1 980	2 375	3 335	4 440
Min. water volume of installation (1)	l	15	20	25	35	25	35	45	55	75
No. of fans		1			2	1	2			
Fan diameter	mm	450								560
Total fan consumption	W	140	170		2 x 185	170	2 x 185		2 x 180	2 x 200
Total fan amperage	A	0.6	0.8		2 x 0.87	0.8	2 x 0.87			2 x 1.30
Total air flow	m^3/h	2 900	3 150				6 150		6 300	7 200
Refrigerant type		R-410A								
Refrigerant charge	kg	1.86	2.55	2.35	3.14	2.35	3.50	3.40	5.80	8.20
Sound power	dB (A)	70	70	71	73	71	73	73	74	78
Sound pressure at 5 m.	dB (A)	44	44	45	47	45	47	47	48	51
Sound pressure at 10 m.	dB (A)	40	40	41	43	41	43	43	44	48
Dimensions										
Length	mm	905							1 430	1 876
Width	mm	460							502	
Height	mm	762	965		1 270	965	1 270			
Water connections, female		1"							1 1/4"	
Water filter, female		1"					1 1/4"			
No. of pumps		1								
Available static pressure at nominal flow (without filter) (2)	kPa	51	80	75	116	75	118	160	130	191
Available static pressure at nominal flow (with filter) (3)	kPa	49	76	67.5	100	67.5	116	157.5	124	182
Pump amperage	W	160	210		400	210	400	490	390	755
Pump consumption	A	0.65	0.95		1.8	0.95	1.8	2.15	1.1	1.34
Unit water content	l	1	1.1	1.2	1.5	1.2	1.5	2	2.8	3.2
Expansion vessel volume	l	1	2		5	2	5			8
Relief valve setting	Bar	6								
Max. unit power supply consumption	kW	2.57	3.48	4.79	5.51	4.79	5.68	7.6	8.70	12.09
Max. unit current amperage	A	11.75	16.4	23	25.7	5.5	11.6	12.4	15.5	21
Start-up current (compressor)	A	60	82	97	116	48	51	74	95	118
Weight (4)	kg	77	102	103	154	103	150	164	235	330

(1) On installations with lower volumes, and in low charge conditions, the “suppress buffer tank” function will activate automatically. Consequently, water temperature will lose precision in accordance with the decrease of the total water volume of the installation. Please consult before applying values lower to those indicated. (2) Available static pressure, Eurovent certified. (3) Pressure with clean filter. (4) Weight for empty unit.

Operation, cooling and hydraulic diagram, heat pump unit YLHA PLUS 5 to 15



SAFETY/CONTROL DEVICES
- **A** High pressure switch
- **B** Low pressure switch
- **C** Pressure transducer port
- **E** Condensing unit temp. sensor (fan speed, defrost and display settings)
- **F** Water outlet temperature sensor (antifreeze and display)
- **G** Water intake temperature sensor (Setting and display)

COMPONENTS
- **1** Compressor
- **2** Air cooled condenser
- **3** Filter-dryer
- **4** Expansion valve
- **5** Water pump
- **6** Plate heat exchanger
- **7** Automatic air bleed
- **8** Expansion vessel
- **9** Four-way valve
- **10** Liquid receiver
- **11** Drain connection
- **12** Water filter (not inside the unit)
- **13** Relief valve
- **14** Flow switch

→ Pipe connection with Schrader valve

----- For units with hydro kit only

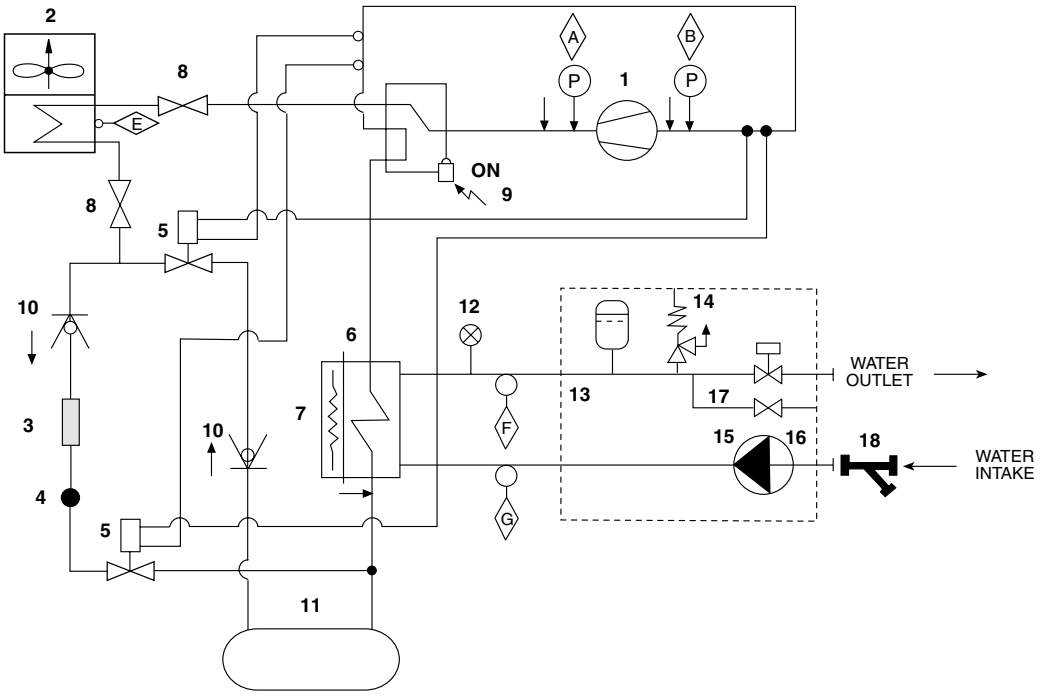
Cooling cycle

The 4-way valve is activated. Heat exchange takes place between the heat transfer liquid (water or glycol water) and the refrigerant in the plate heat exchanger. Water is cooled, and refrigerant is evaporated and reheated. Then the Scroll type compressor condenses the refrigerant (gas) until the condensing pressure is reached, and the refrigerant goes to the air cooled condensing unit. In the air cooled condensing unit, heat is exchanged between the air and the refrigerant. The air is heated and evacuated from the chiller (heat rejection). The refrigerant is condensed and sub-cooled. Then the refrigerant (liquid) goes on to the expansion valve, where it is expanded until the evaporating pressure is reached, at which time it goes to the plate heat exchanger to start a new cooling cycle.

Heating cycle

The cooling mode is inverted. The 4-way valve is not activated. The condensing unit becomes the evaporating unit, and the evaporating unit becomes the condensing unit. The water in the plate heat exchanger is heated.

Operation, cooling and hydraulic diagram, heat pump unit YLHA PLUS 20 and 27



SAFETY/CONTROL DEVICES
- **A** High pressure switch
- **B** Low pressure switch
- **E** Condensing unit temperature sensors (fan speed setting and display)
- **F** Water outlet temperature sensor (antifreeze, setting and display)
- **G** Water intake temperature sensor (setting and display)

COMPONENTS
- **1** Tandem compressor
- **2** Air cooled condenser
- **3** Filter dryer
- **4** Liquid sight glass
- **5** Expansion valve
- **6** Heat exchanger
- **7** Exchanger antifreeze heater
- **8** Globe valve (20 and 27 only)
- **9** 4-way valve
- **10** Check valve
- **11** Liquid receiver
- **12** Automatic air bleed
- **13** Expansion vessel
- **14** Relief valve
- **15** Water pump
- **16** Flow switch
- **17** Drain connection
- **18** Water filter (not inside the unit)

→ Pipe connection with Schrader valve

----- For units with hydro kit only

Table 1. Cooling capacities YLHA PLUS 5 to 27

YLHA Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)															
		20		25		30		32		35		40		43		46	
		Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
5 M	5	6.00	1.50	5.70	1.58	5.25	1.70	5.10	1.80	5.06	1.90	4.49	2.10	4.22	2.23	3.88	2.50
	6	6.25	1.50	5.80	1.59	5.45	1.71	5.29	1.81	5.23	1.90	4.77	2.11	4.47	2.23	4.07	2.50
	7	6.50	1.51	5.90	1.60	5.60	1.72	5.48	1.81	5.40	1.91	5.06	2.12	4.72	2.24	4.22	2.51
	8	6.60	1.51	6.00	1.61	5.67	1.73	5.59	1.82	5.55	1.92	5.21	2.13	4.87	2.26	4.41	2.51
	10	6.70	1.51	6.20	1.61	5.86	1.75	5.70	1.84	5.70	1.95	5.36	2.16	5.10	2.29	4.64	2.52
	12	6.80	1.52	6.40	1.62	6.01	1.76	5.86	1.85	5.82	1.97	5.51	2.19	5.32	2.32	4.98	2.52
	15	7.00	1.52	6.70	1.63	6.24	1.78	6.08	1.87	5.97	2.00	5.70	2.22	5.59	2.37	5.30	2.53
7 M	5	7.60	2.06	7.30	2.14	6.90	2.30	6.70	2.43	6.65	2.56	5.90	2.84	5.55	3.01	5.10	3.20
	6	7.75	2.07	7.45	2.15	7.10	2.31	6.95	2.44	6.88	2.57	6.28	2.85	5.88	3.02	5.35	3.24
	7	7.90	2.07	7.60	2.16	7.30	2.32	7.20	2.45	7.10	2.58	6.65	2.86	6.20	3.03	5.55	3.28
	8	8.05	2.08	7.75	2.17	7.45	2.34	7.35	2.46	7.30	2.60	6.85	2.88	6.40	3.05	5.80	3.32
	10	8.30	2.08	7.90	2.18	7.70	2.36	7.50	2.48	7.50	2.63	7.05	2.92	6.70	3.09	6.10	3.38
	12	8.55	2.09	8.20	2.19	7.90	2.38	7.70	2.50	7.65	2.66	7.25	2.96	7.00	3.14	6.55	3.42
	15	8.90	2.09	8.50	2.20	8.20	2.40	8.00	2.53	7.85	2.70	7.50	3.00	7.35	3.20	6.97	3.48
9 M	5	9.31	2.76	8.95	2.87	8.45	3.08	8.21	3.26	8.15	3.43	7.23	3.81	6.80	4.04	6.25	4.29
	6	9.50	2.78	9.13	2.88	8.70	3.10	8.52	3.27	8.42	3.45	7.69	3.82	7.20	4.04	6.56	4.35
	7	9.68	2.78	9.31	2.90	8.95	3.11	8.82	3.29	8.70	3.46	8.15	3.84	7.60	4.06	6.80	4.40
	8	9.86	2.79	9.50	2.91	9.13	3.14	9.01	3.30	8.95	3.49	8.39	3.86	7.84	4.09	7.11	4.45
	10	10.17	2.79	9.68	2.92	9.44	3.16	9.19	3.33	9.19	3.53	8.64	3.92	8.21	4.14	7.47	4.53
	12	10.48	2.80	10.05	2.94	9.68	3.19	9.44	3.35	9.37	3.57	8.88	3.97	8.58	4.21	8.03	4.59
	15	10.91	2.80	10.42	2.95	10.05	3.22	9.80	3.39	9.62	3.62	9.19	4.02	9.01	4.29	8.54	4.67
9 T	5	9.31	2.76	8.95	2.87	8.45	3.08	8.21	3.26	8.15	3.43	7.23	3.81	6.80	4.04	6.25	4.29
	6	9.50	2.78	9.13	2.88	8.70	3.10	8.52	3.27	8.42	3.45	7.69	3.82	7.20	4.04	6.56	4.35
	7	9.68	2.78	9.31	2.90	8.95	3.11	8.82	3.29	8.70	3.46	8.15	3.84	7.60	4.06	6.80	4.40
	8	9.86	2.79	9.50	2.91	9.13	3.14	9.01	3.30	8.95	3.49	8.39	3.86	7.84	4.09	7.11	4.45
	10	10.17	2.79	9.68	2.92	9.44	3.16	9.19	3.33	9.19	3.53	8.64	3.92	8.21	4.14	7.47	4.53
	12	10.48	2.80	10.05	2.94	9.68	3.19	9.44	3.35	9.37	3.57	8.88	3.97	8.58	4.21	8.03	4.59
	15	10.91	2.80	10.42	2.95	10.05	3.22	9.80	3.39	9.62	3.62	9.19	4.02	9.01	4.29	8.54	4.67
12 M	5	12.63	3.36	12.08	3.48	11.60	3.81	11.09	4.02	11.01	4.24	9.76	4.70	9.18	4.98	8.60	5.28
	6	12.90	3.37	12.33	3.50	11.90	3.82	11.50	4.04	11.38	4.25	10.38	4.71	9.72	4.99	8.85	5.32
	7	13.40	3.39	12.99	3.52	12.43	3.84	11.92	4.05	11.75	4.27	11.01	4.73	10.26	5.01	9.18	5.34
	8	13.55	3.44	12.83	3.59	12.55	3.87	12.16	4.07	12.08	4.30	11.34	4.77	10.59	5.05	9.60	5.36
	10	13.74	3.44	13.07	3.61	12.74	3.91	12.41	4.10	12.41	4.35	11.67	4.83	11.09	5.11	10.10	5.40
	12	14.15	3.46	13.57	3.62	13.07	3.94	12.74	4.14	12.66	4.40	12.00	4.90	11.58	5.20	10.84	5.44
	15	14.73	3.46	14.07	3.64	13.57	3.97	13.24	4.19	12.99	4.47	12.41	4.97	12.16	5.30	11.53	5.52
12 T	5	12.9	3.27	12.34	3.39	11.85	3.71	11.32	3.92	11.24	4.13	9.97	4.58	9.38	4.85	8.78	5.14
	6	13.17	3.28	12.59	3.41	12.15	3.72	11.75	3.93	11.62	4.14	10.61	4.59	9.93	4.86	9.04	5.18
	7	13.69	3.30	13.27	3.43	12.69	3.74	12.17	3.95	12.00	4.16	11.24	4.61	10.48	4.89	9.38	5.20
	8	13.84	3.35	13.10	3.50	12.82	3.77	12.42	3.97	12.34	4.19	11.58	4.64	10.82	4.92	9.80	5.22
	10	14.03	3.35	13.35	3.52	13.01	3.81	12.68	4.00	12.68	4.24	11.92	4.71	11.32	4.98	10.31	5.26
	12	14.45	3.37	13.86	3.53	13.35	3.84	13.01	4.03	12.93	4.29	12.25	4.77	11.83	5.06	11.07	5.30
	15	15.04	3.37	14.37	3.55	13.86	3.87	13.52	4.08	13.27	4.35	12.68	4.84	12.42	5.16	11.78	5.38
15 T	5	14.83	4.30	14.19	4.46	13.62	4.88	13.02	5.15	12.93	5.43	11.47	6.02	10.79	6.38	10.10	6.76
	6	15.15	4.32	14.48	4.48	13.98	4.90	13.51	5.17	13.36	5.45	12.20	6.03	11.42	6.39	10.40	6.82
	7	15.74	4.34	15.26	4.51	14.60	4.92	13.99	5.19	13.80	5.47	12.93	6.06	12.05	6.42	10.79	6.84
	8	15.91	4.41	15.06	4.60	14.74	4.96	14.29	5.22	14.19	5.51	13.31	6.11	12.44	6.47	11.27	6.87
	10	16.13	4.41	15.35	4.62	14.97	5.00	14.58	5.26	14.58	5.58	13.70	6.19	13.02	6.55	11.86	6.92
	12	16.62	4.43	15.94	4.64	15.35	5.05	14.97	5.30	14.87	5.64	14.09	6.28	13.61	6.66	12.73	6.97
	15	17.30	4.43	16.52	4.66	15.94	5.09	15.55	5.36	15.26	5.72	14.58	6.36	14.29	6.78	13.55	7.07
20 T	5	21.00	5.36	20.83	5.69	20.09	5.96	19.74	6.19	19.16	6.67	17.06	7.35	16.29	7.83	14.21	8.35
	6	22.24	5.39	21.68	5.75	20.88	6.02	20.45	6.25	19.80	7.00	17.97	7.40	17.12	7.93	16.20	8.40
	7	23.17	5.43	22.58	5.80	21.67	6.08	21.21	6.30	19.40	7.04	18.87	7.46	17.91	8.05	16.97	8.45
	8	23.89	5.46	23.25	5.83	22.30	6.14	21.73	6.36	20.86	7.08	19.31	7.52	18.27	8.11	17.26	8.50
	10	25.30	5.54	24.60	5.89	23.53	6.20	22.88	6.42	21.88	7.11	20.38	7.58	19.22	8.17	18.12	8.55
	12	26.79	5.60	25.99	5.93	24.79	6.23	24.02	6.46	22.94	7.11	21.39	7.64	20.14	8.23	18.92	8.60
	15	29.24	5.69	28.04	6.01	26.64	6.30	25.75	6.53	24.54	7.15	23.05	7.72	21.62	8.27	20.30	8.70
27 T	5	28.29	6.97	27.71	7.17	26.71	7.51	26.26	7.80	25.49	8.78	22.69	9.26	21.67	9.87	20.49	10.60
	6	29.58	7.01	28.84	7.25	27.77	7.58	27.19	7.87	26.33	8.82	23.90	9.33	22.77	10.00	21.55	10.71
	7	30.82	7.09	30.03	7.31	28.82	7.66	28.20	7.94	25.80	8.87	25.09	9.40	23.82	10.14	22.57	10.86
	8	31.77	7.12	30.92	7.34	29.66	7.73	28.90	8.01	27.74	8.92	25.68	9.47	24.30	10.22	22.95	10.98
	10	33.64	7.20	32.72	7.43	31.30	7.81	30.43	8.09	29.10	8.96	27.11	9.55	25.56	10.30	24.10	11.06
	12	35.63	7.23	34.57	7.47	32.96	7.85	31.94	8.13	30.50	8.96	28.45	9.63	26.79	10.37	25.16	11.14
	15	38.52	7.33	37.30	7.57	35.43	7.94	34.25	8.23	32.63	9.01	30.65	9.73	28.75	10.41	26.95	11.22

Table 2. Cooling capacities YLHA PLUS 5 to 27 (35% ethylene glycol)

YLHA Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)															
		20		25		30		32		35		40		43		46	
		Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
5 M	-5	3.62	1.15	3.46	1.24	3.29	1.35	3.21	1.40	3.10	1.47	2.84	1.61	2.69	1.69	2.54	1.78
	-4	3.81	1.17	3.64	1.27	3.45	1.38	3.37	1.43	3.25	1.50	2.98	1.64	2.82	1.73	2.65	1.83
	-2	4.16	1.23	4.00	1.33	3.78	1.45	3.70	1.50	3.56	1.57	3.27	1.72	3.09	1.81	2.89	1.91
	0	4.51	1.29	4.38	1.39	4.16	1.51	4.04	1.56	3.89	1.64	3.57	1.80	3.38	1.89	3.13	1.99
	2	5.00	1.35	4.77	1.45	4.53	1.58	4.41	1.63	4.25	1.72	3.90	1.88	3.69	1.97	3.48	2.06
	4	5.35	1.40	5.16	1.52	4.90	1.65	4.79	1.70	4.61	1.79	4.23	1.96	4.00	2.06	3.78	2.18
7 M	-5	4.76	1.55	4.54	1.68	4.33	1.83	4.23	1.89	4.07	1.98	3.73	2.17	3.53	2.28	3.34	2.40
	-4	5.01	1.59	4.79	1.72	4.53	1.87	4.43	1.93	4.27	2.03	3.91	2.22	3.70	2.33	3.48	2.48
	-2	5.47	1.66	5.26	1.80	4.97	1.96	4.86	2.02	4.68	2.12	4.30	2.32	4.06	2.44	3.80	2.58
	0	5.93	1.74	5.75	1.88	5.47	2.04	5.31	2.11	5.12	2.22	4.70	2.43	4.44	2.55	4.12	2.68
	2	6.57	1.82	6.27	1.96	5.95	2.13	5.80	2.20	5.59	2.32	5.13	2.54	4.85	2.67	4.58	2.79
	4	7.03	1.90	6.78	2.05	6.44	2.22	6.29	2.30	6.06	2.42	5.56	2.65	5.26	2.78	4.97	2.94
9 M	-5	5.83	2.08	5.57	2.25	5.30	2.45	5.18	2.53	4.99	2.66	4.58	2.91	4.33	3.06	4.09	3.22
	-4	6.13	2.13	5.86	2.30	5.56	2.51	5.43	2.59	5.23	2.72	4.79	2.98	4.54	3.13	4.26	3.32
	-2	6.70	2.23	6.45	2.41	6.09	2.62	5.95	2.71	5.74	2.85	5.26	3.11	4.98	3.27	4.65	3.46
	0	7.26	2.34	7.05	2.52	6.70	2.74	6.51	2.83	6.27	2.98	5.76	3.26	5.44	3.43	5.05	3.60
	2	8.05	2.44	7.68	2.63	7.30	2.86	7.11	2.96	6.85	3.11	6.28	3.40	5.94	3.58	5.61	3.74
	4	8.61	2.54	8.31	2.74	7.89	2.98	7.71	3.08	7.43	3.24	6.81	3.55	6.45	3.73	6.09	3.94
9 T	-5	5.83	2.08	5.57	2.25	5.30	2.45	5.18	2.53	4.99	2.66	4.58	2.91	4.33	3.06	4.09	3.22
	-4	6.13	2.13	5.86	2.30	5.56	2.51	5.43	2.59	5.23	2.72	4.79	2.98	4.54	3.13	4.26	3.32
	-2	6.70	2.23	6.45	2.41	6.09	2.62	5.95	2.71	5.74	2.85	5.26	3.11	4.98	3.27	4.65	3.46
	0	7.26	2.34	7.05	2.52	6.70	2.74	6.51	2.83	6.27	2.98	5.76	3.26	5.44	3.43	5.05	3.60
	2	8.05	2.44	7.68	2.63	7.30	2.86	7.11	2.96	6.85	3.11	6.28	3.40	5.94	3.58	5.61	3.74
	4	8.61	2.54	8.31	2.74	7.89	2.98	7.71	3.08	7.43	3.24	6.81	3.55	6.45	3.73	6.09	3.94
12 M	-5	7.87	2.56	7.52	2.78	7.16	3.02	6.99	3.12	6.74	3.28	6.18	3.59	5.85	3.77	5.52	3.97
	-4	8.28	2.63	7.92	2.84	7.50	3.09	7.33	3.19	7.06	3.36	6.48	3.67	6.13	3.86	5.76	4.10
	-2	9.05	2.75	8.71	2.97	8.23	3.24	8.04	3.34	7.75	3.52	7.11	3.84	6.72	4.04	6.29	4.27
	0	9.81	2.88	9.52	3.11	9.05	3.38	8.79	3.49	8.47	3.67	7.77	4.02	7.35	4.23	6.82	4.44
	2	10.87	3.01	10.37	3.25	9.85	3.53	9.60	3.65	9.25	3.84	8.49	4.20	8.03	4.41	7.58	4.61
	4	11.63	3.14	11.22	3.39	10.66	3.68	10.41	3.80	10.03	4.00	9.20	4.38	8.71	4.60	8.23	4.87
12 T	-5	8.04	2.50	7.68	2.71	7.31	2.94	7.14	3.04	6.88	3.20	6.31	3.50	5.97	3.67	5.64	3.87
	-4	8.46	2.56	8.09	2.77	7.66	3.01	7.49	3.11	7.21	3.27	6.61	3.58	6.26	3.76	5.88	3.99
	-2	9.24	2.68	8.89	2.89	8.41	3.15	8.21	3.26	7.91	3.43	7.26	3.74	6.86	3.94	6.42	4.16
	0	10.02	2.81	9.72	3.03	9.24	3.29	8.98	3.40	8.65	3.58	7.94	3.92	7.50	4.12	6.96	4.33
	2	11.10	2.93	10.59	3.16	10.06	3.44	9.81	3.56	9.45	3.74	8.67	4.09	8.20	4.30	7.74	4.49
	4	11.88	3.06	11.46	3.30	10.89	3.59	10.64	3.71	10.25	3.90	9.40	4.26	8.89	4.48	8.40	4.74
15 T	-5	9.25	3.28	8.83	3.56	8.41	3.87	8.21	4.00	7.91	4.21	7.26	4.60	6.87	4.83	6.49	5.09
	-4	9.73	3.36	9.30	3.64	8.81	3.96	8.61	4.09	8.29	4.30	7.61	4.71	7.20	4.95	6.76	5.25
	-2	10.63	3.53	10.22	3.81	9.67	4.15	9.44	4.28	9.10	4.50	8.35	4.92	7.89	5.18	7.38	5.47
	0	11.52	3.69	11.18	3.98	10.63	4.33	10.33	4.48	9.95	4.71	9.13	5.15	8.63	5.41	8.00	5.69
	2	12.77	3.86	12.18	4.16	11.57	4.52	11.28	4.67	10.87	4.92	9.97	5.38	9.43	5.65	8.90	5.91
	4	13.66	4.02	13.18	4.34	12.52	4.72	12.23	4.87	11.78	5.13	10.81	5.61	10.22	5.89	9.66	6.24
20 T	-5	13.00	4.22	12.42	4.58	11.82	4.98	11.55	5.15	11.12	5.41	10.20	5.92	9.65	6.22	9.12	6.55
	-4	13.68	4.33	13.08	4.69	12.39	5.10	12.10	5.27	11.66	5.54	10.69	6.06	10.12	6.37	9.51	6.76
	-2	14.94	4.54	14.37	4.90	13.59	5.34	13.28	5.51	12.79	5.80	11.74	6.33	11.10	6.66	10.38	7.04
	0	16.20	4.75	15.72	5.12	14.94	5.57	14.52	5.76	13.98	6.06	12.83	6.63	12.13	6.97	11.25	7.32
	2	17.95	4.96	17.12	5.35	16.27	5.82	15.86	6.02	15.27	6.33	14.01	6.92	13.25	7.28	12.51	7.60
	4	19.21	5.17	18.53	5.58	17.60	6.07	17.19	6.27	16.57	6.60	15.20	7.22	14.37	7.58	13.58	8.03
27 T	-5	17.29	5.32	16.51	5.77	15.72	6.28	15.36	6.48	14.79	6.82	13.57	7.45	12.84	7.83	12.13	8.25
	-4	18.19	5.46	17.39	5.90	16.48	6.43	16.09	6.63	15.50	6.98	14.22	7.63	13.46	8.02	12.64	8.52
	-2	19.87	5.72	19.12	6.17	18.07	6.72	17.66	6.95	17.01	7.30	15.61	7.98	14.76	8.39	13.80	8.87
	0	21.54	5.99	20.90	6.45	19.87	7.02	19.31	7.26	18.59	7.63	17.07	8.35	16.13	8.78	14.96	9.22
	2	23.87	6.25	22.77	6.75	21.64	7.33	21.09	7.58	20.31	7.98	18.64	8.72	17.62	9.17	16.64	9.58
	4	25.54	6.52	24.64	7.04	23.40	7.65	22.87	7.90	22.03	8.32	20.21	9.09	19.12	9.56	18.06	10.11

Table 3. Heating capacities YLHA PLUS 5 to 27

YLHA Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)																	
		-15		-10		-7		0		5		7		10		15		20	
		Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power	Cap.	Abs. power
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
5 M	**30**	1.60	1.40	1.69	1.41	2.48	1.42	4.30	1.43	5.32	1.43	6.46	1.44	6.74	1.45	7.58	1.45	7.85	1.46
	35	1.51	1.35	1.89	1.55	2.40	1.56	4.25	1.57	5.28	1.58	6.40	1.60	6.62	1.60	7.52	1.61	7.63	1.62
	40	-	-	2.04	1.72	2.35	1.72	4.20	1.73	5.24	1.74	6.35	1.75	6.46	1.75	7.45	1.76	7.45	1.77
	45	-	-	-	-	2.32	1.91	4.15	1.88	5.19	1.89	6.30	1.90	6.45	1.91	7.39	1.92	7.32	1.92
	50	-	-	-	-	-	-	4.10	2.00	5.11	2.02	6.25	2.03	6.43	2.05	6.85	2.06	7.19	2.08
7 M	**30**	1.82	1.82	2.84	1.85	4.10	1.93	5.06	1.85	6.00	1.86	7.29	1.87	7.60	1.88	8.54	1.89	8.85	1.90
	35	1.70	1.75	2.83	2.03	3.87	2.11	4.95	2.04	5.95	2.06	7.21	2.07	7.46	2.08	8.47	2.09	8.60	2.10
	40	-	-	2.81	2.21	3.76	2.23	4.85	2.25	5.90	2.26	7.16	2.27	7.29	2.28	8.40	2.29	8.40	2.30
	45	-	-	-	-	3.59	2.45	4.77	2.45	5.85	2.46	7.10	2.47	7.27	2.48	8.32	2.49	8.25	2.50
	50	-	-	-	-	-	-	4.65	2.60	5.75	2.62	7.04	2.64	7.25	2.66	7.72	2.68	8.10	2.70
9 M	**30**	2.41	2.00	3.52	2.05	5.09	2.13	6.69	2.20	8.04	2.20	9.77	2.21	10.19	2.22	11.46	2.23	12.28	2.25
	35	2.28	2.20	3.51	2.23	4.81	2.33	6.58	2.46	7.98	2.48	9.67	2.49	10.00	2.50	11.36	2.52	12.05	2.53
	40	-	-	3.49	2.43	4.67	2.54	6.46	2.72	7.91	2.76	9.59	2.77	9.77	2.78	11.26	2.80	11.81	2.81
	45	-	-	-	-	4.45	2.74	6.34	2.97	7.85	3.09	9.52	3.15	9.74	3.16	11.16	3.18	11.58	3.18
	50	-	-	-	-	-	-	6.22	3.20	7.71	3.21	9.45	3.31	9.72	3.32	10.36	3.33	11.42	3.35
9 T	**30**	2.41	2.00	3.52	2.05	5.09	2.13	6.69	2.20	8.04	2.20	9.77	2.21	10.19	2.22	11.46	2.23	12.28	2.25
	35	2.28	2.20	3.51	2.23	4.81	2.33	6.58	2.46	7.98	2.48	9.67	2.49	10.00	2.50	11.36	2.52	12.05	2.53
	40	-	-	3.49	2.43	4.67	2.54	6.46	2.72	7.91	2.76	9.59	2.77	9.77	2.78	11.26	2.80	11.81	2.81
	45	-	-	-	-	4.45	2.74	6.34	2.97	7.85	3.09	9.52	3.15	9.74	3.16	11.16	3.18	11.58	3.18
	50	-	-	-	-	-	-	6.22	3.20	7.71	3.21	9.45	3.31	9.72	3.32	10.36	3.33	11.42	3.35
12 M	**30**	3.11	2.40	4.75	2.50	6.78	2.60	8.20	2.72	10.35	2.74	12.57	2.75	13.11	2.76	14.74	2.78	15.80	2.80
	35	2.93	2.70	4.73	2.80	6.41	2.90	8.06	3.08	10.26	3.09	12.44	3.10	12.86	3.11	14.62	3.13	15.50	3.15
	40	-	-	4.71	3.00	6.24	3.10	7.90	3.42	10.18	3.44	12.35	3.45	12.57	3.46	14.49	3.48	15.20	3.50
	45	-	-	-	-	5.95	3.40	7.80	3.70	10.10	3.85	12.25	3.92	12.54	3.94	14.36	3.95	14.90	3.96
	50	-	-	-	-	-	-	7.70	3.90	9.93	4.00	12.15	4.12	12.51	4.13	13.33	4.15	14.70	4.17
12 T	**30**	3.15	2.86	3.66	2.86	5.08	2.87	8.33	2.88	10.51	2.90	12.77	2.91	13.31	2.92	14.97	2.94	16.05	2.96
	35	2.98	3.23	3.45	3.24	4.77	3.33	8.19	3.26	10.42	3.27	12.64	3.28	13.06	3.29	14.84	3.31	15.74	3.33
	40	-	-	3.25	3.49	4.57	3.49	8.02	3.62	10.34	3.64	12.54	3.65	12.77	3.66	14.71	3.68	15.44	3.71
	45	-	-	-	-	4.27	3.65	7.92	3.92	10.25	4.08	12.44	4.15	12.73	4.17	14.58	4.18	15.13	4.19
	50	-	-	-	-	-	-	7.82	4.13	10.08	4.23	12.34	4.36	12.70	4.37	13.53	4.39	14.93	4.41
15 T	**30**	4.08	3.50	6.05	3.56	8.75	3.57	10.78	3.58	13.60	3.61	16.52	3.62	17.23	3.63	19.38	3.66	20.77	3.69
	35	3.85	3.80	6.02	3.87	8.26	4.03	10.59	4.05	13.49	4.07	16.35	4.08	16.91	4.09	19.21	4.12	20.37	4.15
	40	-	-	6.00	4.22	8.02	4.41	10.38	4.50	13.38	4.53	16.23	4.54	16.52	4.55	19.04	4.58	19.98	4.61
	45	-	-	-	-	7.65	4.75	10.25	4.87	13.27	5.07	16.10	5.16	16.48	5.18	18.88	5.20	19.58	5.21
	50	-	-	-	-	-	-	10.12	5.13	13.05	5.27	15.97	5.42	16.44	5.44	17.52	5.46	19.32	5.49
20 T	**30**	8.55	4.25	10.29	4.32	14.87	4.48	18.60	4.80	19.40	4.85	20.66	4.90	22.81	4.56	25.15	4.65	26.30	4.77
	35	8.30	4.70	9.68	4.77	13.27	4.97	18.15	5.26	19.26	5.32	20.49	5.41	22.63	5.60	24.94	5.99	25.87	5.25
	40	-	-	9.08	5.27	12.15	5.50	16.80	5.90	18.48	5.96	20.31	6.04	22.45	6.12	24.72	6.57	25.45	5.75
	45	-	-	-	-	10.82	5.99	15.41	6.49	17.78	6.56	20.14	6.60	22.23	6.46	24.50	6.50	25.02	6.55
	50	-	-	-	-	-	-	14.09	7.00	16.92	7.05	19.79	7.10	21.37	6.57	22.74	6.62	24.60	6.72
27 T	**30**	11.25	5.20	13.43	5.35	19.42	5.83	23.80	6.15	25.17	6.25	26.98	6.38	30.01	5.91	33.09	6.03	35.90	6.25
	35	10.92	5.90	12.94	6.04	17.32	6.47	23.50	6.85	25.12	6.92	26.75	7.04	29.78	7.26	32.81	7.77	34.80	6.80
	40	-	-	12.45	6.73	15.87	7.16	21.94	7.68	24.21	7.76	26.53	7.86	29.54	7.93	32.53	8.52	34.00	7.45
	45	-	-	-	-	14.86	7.73	20.12	8.45	23.23	8.54	26.30	8.59	29.25	8.37	32.24	8.42	33.50	8.49
	50	-	-	-	-	-	-	18.41	9.11	22.12	9.18	25.85	9.24	28.12	8.51	29.92	8.58	32.80	9.15

Table 4. Available pressure and pressure drop for hydraulic circuit (without filter installed)

Model	Flow l/h	DISP. kPa	ΔP kPa
YLHA 05 MC	600	61	42
	800	55	48
	1 000	46	55
	1 200	36	64
	1 400	25	73
YLHA 07 MC	800	96	18
	1 000	91	25
	1 200	81	32
	1 400	70	39
	1 600	58	47
	1 800	45	56
	2 000	28	66
YLHA 09 MC/TC	1 000	95	20
	1 200	88	23
	1 400	80	28
	1 600	70	34
	1 800	60	39
	2 000	49	44
	2 200	37	49
	2 400	24	57
YLHA 12 MC/TC	1 400	149	11
	1 700	134	17
	2 000	118	23
	2 300	95	32
	2 600	62	42
	2 900	30	57

Table 4. (Cont.)

Model	Flow l/h	DISP. kPa	ΔP kPa
YLHA 15 TC	1 700	221	8
	2 000	200	12
	2 300	170	18
	2 600	140	26
	2 900	105	36
	3 200	60	50
	3 500	10	62
YLHA 20 TC	2 000	175	20
	2 500	160	30
	3 000	145	40
	3 500	125	52
	4 000	105	65
	4 500	83	78
	5 000	60	92
	5 500	30	110
YLHA 27 TC	3 000	245	24
	3 500	228	30
	4 000	208	36
	4 500	187	42
	5 000	163	48
	5 500	140	55
	6 000	112	63
	6 500	83	72
	7 000	49	82
	7 500	15	104

Details with water at 10° C.

If using glycol, apply the correcting factors indicated in Table 6.

Table 5. Pressure drops of filters

1” filter

Flow l/h	600	800	1 000	1 200	1 400	1 600	1 800	2 000	2 200	2 400	2 600
kPa	0.7	1.4	2.6	4.3	6.4	8.9	11.8	15.1	18.8	22.8	27.1

1 ¼” filter

Flow l/h	1 500	2 000	2 500	3 000	3 500	4 000	4 500	5 000	5 500	6 000
kPa	0.9	1.5	2.6	3.9	5.6	7.7	10.1	12.8	15.7	18.8

Table 6. Correcting factors for other glycol concentrations

% in weight	Ethylene glycol		Propylene glycol	
	Capacity	Absorbed power	Capacity	Absorbed power
10	1.061	1.025	1.097	1.033
20	1.036	1.015	1.067	1.023
30	1.015	1.005	1.026	1.008
35	1	1	1	1
40	0.985	0.995	0.974	0.992
50	0.954	0.985	0.923	0.977

If it is necessary to make this selection with different glycol percentages, correct the capacities and absorbed power in tables 2 (35% ethylene glycol), multiplying them by the coefficients indicated in table 6.

Table 7. Sound power spectrum

Models	Frequency (Hz)							dB(A)
	125	250	500	1 000	2 000	4 000	8 000	
YLHA 5	66.2	70.5	67.7	65.7	60.2	55.1	48.8	70
YLHA 7	66.2	70.5	67.7	65.7	60.2	55.1	48.8	70
YLHA 9	74	72.3	67.9	66.1	61.8	56.3	52.3	71
YLHA 12	79.6	74.3	70.2	67.5	62.7	57.7	51.0	73
YLHA 15	79.6	74.3	70.2	67.5	62.7	57.7	51.0	73
YLHA 20	77	72.4	72.9	69.1	63.9	58.2	52.5	74
YLHA 27	75.6	81.3	75.9	70.8	68.6	63.3	55.7	78

The information contained in this table correspond to sound powers in accordance with ISO EN3743.

Selection guide (YLHA PLUS)

Necessary information

The following information is needed to select a YLHA PLUS unit:

1. Cooling capacity needed.
2. Design cold and hot water input and output temperatures.
3. Design water flow, if any of the temperatures in above point 2 is unknown.
4. Design input temperature of air to the condensing unit. Normally, this will be the design ambient temperature of summer and winter air, unless influenced by the situation or other factors.
5. Altitude above sea level.
6. Design gumming coefficient of the evaporating unit.

Note: Points 1, 2 and 3 should be related by means of the following formula:

$$\text{Cooling capacity kW} = \frac{\text{l/h cold water x °C differential}}{860}$$

Table 8. Gumming coefficients

Evaporating unit		
Gumming coeff. m² °C/kW	Capacity factor	Comp. absorbed power factor
0.044	1.000	1.000
0.088	0.987	0.995
0.176	0.964	0.985
0.352	0.926	0.962

Table 9. Altitude factors

Altitude (m)	Capacity factor	Comp. absorbed power factor
0	1.000	1.000
600	0.987	1.010
1 200	0.973	1.020
1 800	0.958	1.029
2 400	0.943	1.038

YLHA selection method

1. Determine the correct YLHA size by selecting the model from tables 1 and 3. The cooling and heating capacities required in design conditions of the water outlet and air intake temperatures should be as close as possible.
2. Apply gumming (table 8) and altitude (table 9) correcting factors to the capacity and power values shown in the capacity tables that correspond to the cool and heat modes. Make sure that the corrected capacity is still sufficient for your needs.
3. Using the corrected capacities of the unit, select either the design temperature differentials or the flow.
4. Make sure the selections made are within the operating limits of the YLHA PLUS units.

Selection example

A heat pump operating at a 35° C ambient temperature should chill water from 13° C to 7° C, with a 7 kW cooling capacity.
A heating capacity of 4.5 kW is needed in 0° C design ambient temperature conditions, with a hot water outlet temperature of 45° C.
The gumming coefficient is 0.044 m² °C/kW, with the unit operating at sea level (no corrections).
With a quick glance at capacity tables 1 and 3, we see that a YLHA 7 heat pump gives the approximate required capacities:

Cooling capacity: 7.10 kW
Total unit power consumed: 2.58 kW
Cold water temperature: 13° C to 7° C (Δt = 6° C)

Hot and cold water flow: $\frac{7.10 \times 860}{6} = 1017$ l/h

Heating capacity = 4.67 kW
Total unit absorbed power in heating mode = 2.45 kW
Hot leaving water temperature = 45° C
Hot water temp. differential = $\frac{4.67 \times 860}{1\,017} = 3.95°$ C

Thus, hot water return temperature is = 41° C

All values are within operating limits.

- Pressure drop in hydraulic circuit of a unit without hydro kit.
- From Table 4 we infer that the YLHA 7 MC, with a 1017 l/h flow, has an available pressure of 91 kPa.
- Pressure drop in filter.
- From Table 5, 1" filter, we infer that with a 1017 l/h flow, said filter has a pressure drop of 21.6 kPa.

Selection guide with glycol (cool only units)

Necessary information

The following information is needed to select a YLHA water chiller model:

1. Cooling capacity needed.
2. Design cold water/glycol input and output temperatures to and from the condensing unit.
3. Design water/glycol flow.
4. Design input temperature of air to condensing unit. Normally, this will be the design ambient temperature of summer air, unless influenced by the situation or other factors.
5. Altitude above sea level.
6. Design gumming coefficient of the evaporating unit.

Note: Points 1, 2 and 3 should be related by means of the following formula:

$$\text{Capacity (kW)} = \frac{\Delta t\ (°C) \times \text{Flow (litres/second)}}{\text{Glycol factor}}$$

In which Δt = liquid intake temp. - liquid output temp.

To determine the glycol factor, please see Figure 1 for ethylene glycol, or Figure 3 for propylene glycol. For design output temperature, please see the recommended glycol concentration and the glycol factor in this concentration. This is the minimum concentration to be used for the design output temperature. If a greater concentration is required, the glycol factor can be determined by means of Figure 2 on ethylene glycol or Figure 4 on propylene glycol.

Selection method

1. Determine the correct chiller model by selecting the one that is closest to the capacities required by the design conditions of the glycol outlet and air intake temperatures.

2. Apply the gumming correcting factors that correspond to the gumming coefficient, altitude and glycol concentration, to the capacity and power values that appear in the corresponding capacity tables. Make sure the corrected capacity is still sufficient for your needs.

3. Using the corrected capacities of the selected chiller, set the design temperature range, or the flow, to balance the formulas appearing in the “Necessary Information” section.

4. Always recheck to make sure these selections are within the specified design operating limits.

Selection example

A chiller is required to chill ethylene glycol from 1 to -4° C, with a capacity of 4.5 kW.

The following design conditions are applicable:

Gumming coefficient:	0.088m² °C/kW
Altitude:	1 200 m
Ambient air:	30° C
Glycol concentration:	30% w/w

For a -4° C ethylene glycol output, the concentration recommended in Figure 1 is 30%. Therefore, the specified concentration is appropriate.

From Table 2 (capacities with 35% glycol) we infer that a YLHA 7 unit, in the established design conditions, renders a capacity of 4.53 kW and a consumption of 1.87 kW.

From the design gumming coefficient, use the capacity correcting factors x 0.987 and power x 0.995 (Table 8).

From the design altitude, apply the capacity correcting factors x 9.973 and power x 1.020 (Table 9).

From the design glycol concentration, apply the capacity correcting factors x 1.015 and power x 1.005 (Table 6).

Applying these factors to the selection: YLHA 7

Capacity = 4.53 x 0.987 x 0.973 x 1.015 = 4.41 kW

Comp. power = 1.87 x 0.995 x 1.020 x 1.005 = 1.90 kW

For the specified glycol concentration and a -4° C output temperature, Figure 3 shows a 0.248 glycol factor. Thus, the flow can be determined with the formula appearing in the “Necessary Information” section.

$$4.41\ \text{kW} = \frac{(1 - (-4)) \times \text{Flow (l/s)}}{0{,}248}$$

$$\text{Flow} = \frac{4.41 \times 0.248}{5} = 0.218\ \text{(l/s) or } 788\ \text{(l/h)}$$

This covers the limits of use.

The hydraulic circuit pressure drop can be determined by taking the water pressure drop value (Table 4) for a YLHA unit and multiplying it by the correcting factor (see Fig. 5) for a 30% concentration and an average temperature of -1.5° C, that is to say: $\frac{1 + (-4)}{2} = -1.5$ factor x 1.22

- Corrected pressure drop

17.7 x 1.22 = 21.6 kPa.

- Pressure drop increase

21.6 - 17.7 = 3.9 kPa.

- Final available pressure (Table 4)

97 - 3.9 = 93.1 kPa.

Fig. 1 - Recommended ethylene glycol concentrations

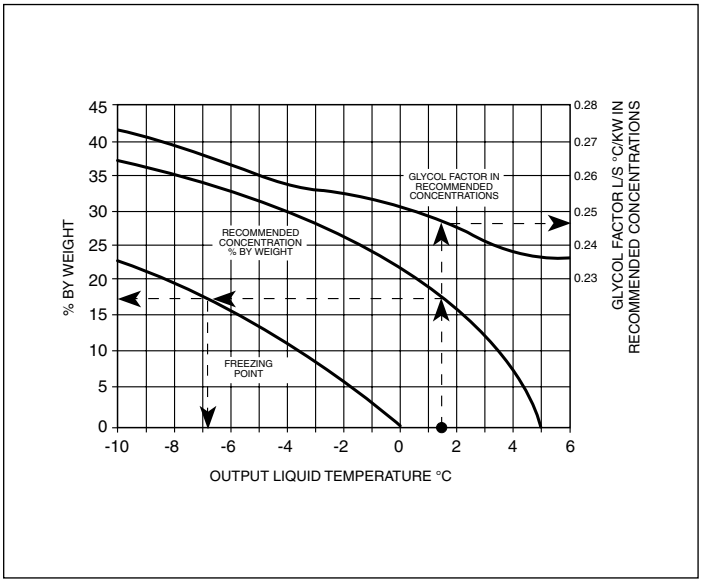


Fig. 2 - Ethylene glycol in other concentrations

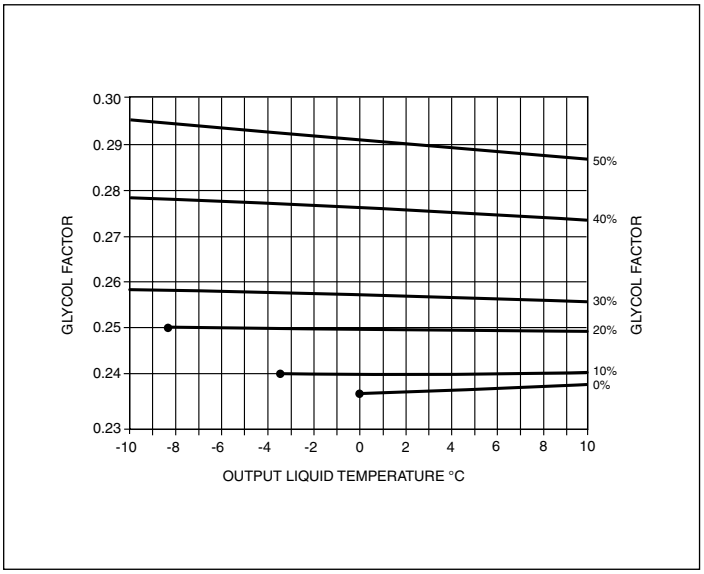


Fig. 3 - Recommended propylene glycol concentrations

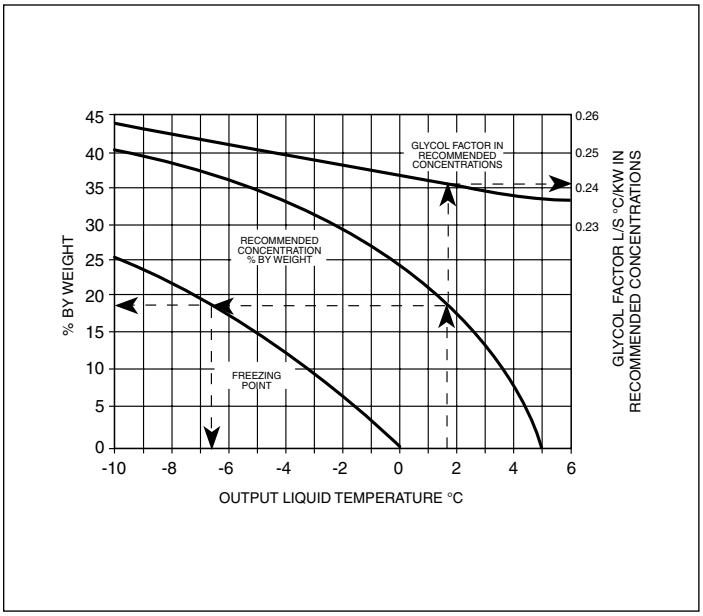


Fig. 4 - Propylene glycol in other concentrations

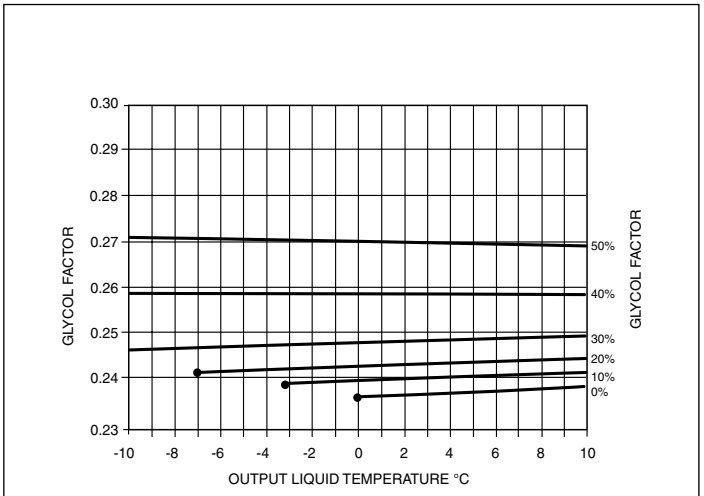


Fig. 5 - Ethylene glycol pressure drop correcting factor

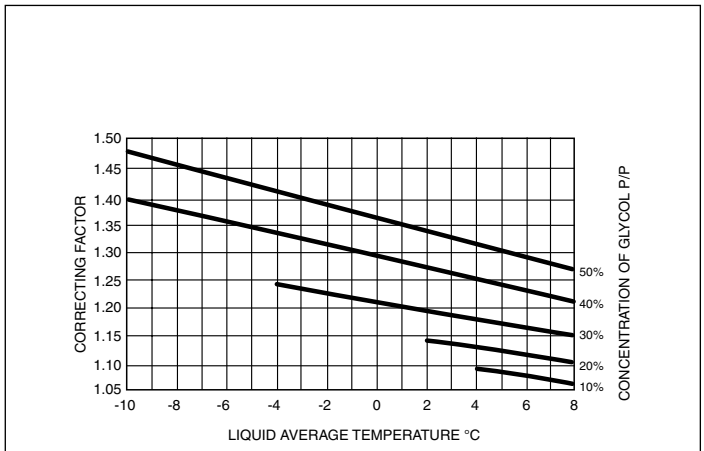
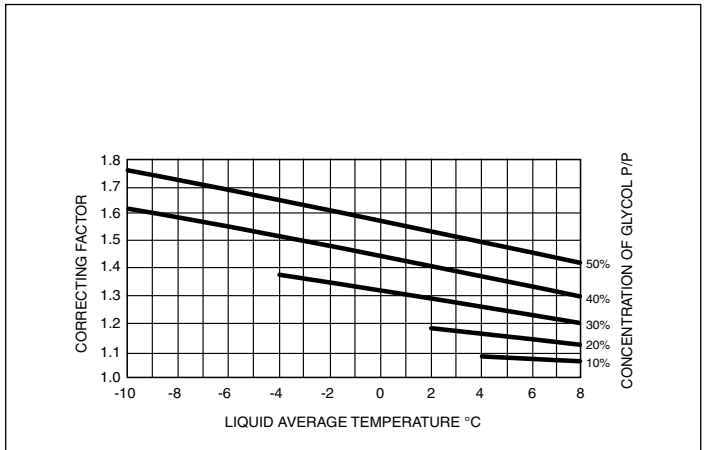


Fig. 6 - Propylene glycol pressure drop correcting factors



Installation instructions

Inspection

Upon reception, inspect the goods and notify the carrier and the insurance company, in writing, of any possible damage during transportation.

Environmental protection

Packing

Packing is made of recyclable material. Its elimination should be carried out in accordance with local regulations on selective collection of residual materials.

Refrigerant

Contains greenhouse effect fluorided gas covered by the Kyoto protocol.

For the type of gas and quantity per system, see the identification plate.

GWP (Global Warming Potential): 2088.

Elimination of the unit

Upon disassembly of the unit, the components should be recuperated ecologically. The cooling circuit is full of refrigerant that should be recuperated and returned to the gas manufacturer for recycling.

Oil will remain in the hermetic compressor and, therefore, must be returned with its circuit sealed.

The air conditioning unit will be deposited in an area determined by the local authorities, for its selective recuperation.

Safety

Installation and maintenance servicing of this air conditioning system should be carried out by qualified and expert personnel only. Maintenance servicing, such as cleaning coils and air filters, should be carried out regularly to maintain optimum performance of the units.

CAUTION

This unit should be installed and used in compliance with:

- Low voltage electro-technical regulations.
- Safety regulations for cooling plants and installations.
- Pressure device regulations.
- Basic building regulations.
- Local regulations.

Transportation

The units should always be transported in vertical position so as to avoid oil leaking out of the compressor. If, for any reason, this position need be changed sporadically, they will remain in that position a strictly necessary period of time only.

Handling

The unit should be handled using the metal rails supplied for fastening and transportation.

Warning symbols

The following symbols indicate the existence of potentially dangerous conditions for users or servicing personnel. Whenever found on the unit, take the meaning of each one into account.

This symbol indicates an electrical danger or risk.

Caution: The unit is equipped with remote control system and can start automatically. Before accessing the interior, disconnect the power supply so as to avoid any contact with the fan turbine in motion.

Caution: Fan in operation.

Caution: It is obligatory to read the instructions prior to any handling.

Caution: Do not touch hot surfaces.

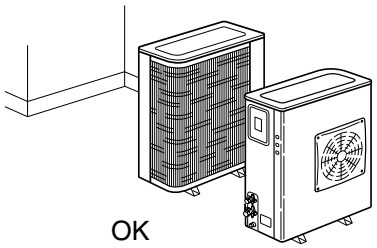
Caution: Possible gas leak due to inadequate handling.

Location

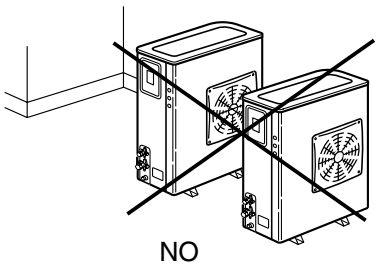
Before locating the unit, make sure you have received the appropriate product by checking the specifications described on the outside of same.
The unit should be placed on a perfectly horizontal plane, making sure the base can support the weight of the unit.
If vibration-free operation is required, the unit can be placed on a cork or similar anti-vibratory base, or fastened to the base with anti-vibratory plates or supports.

Location of several units

Avoid recirculation of air between units.



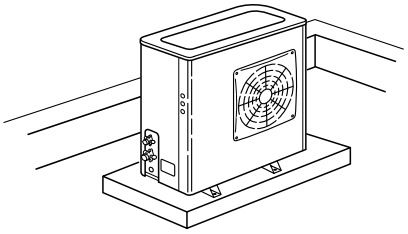
OK



NO

Fastening the unit

Before installing the unit, make sure the structure can support the weight of same.
If the unit is to be placed on the floor, a concrete base should be prepared so as to distribute weight evenly.
Place the unit on a solid base and fasten same by means of bolts and the four holes drilled in the base for this purpose.
Areas with snow. If the unit is installed outdoors and at ground level, it should be raised by supports so as to avoid accumulated snow blocking air flow. These supports should be above the height normally reached by the snow. It is convenient to install anti-snow grids.



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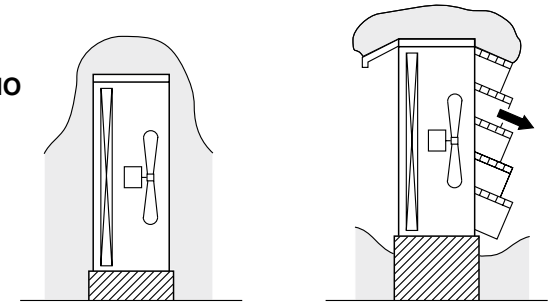
NO

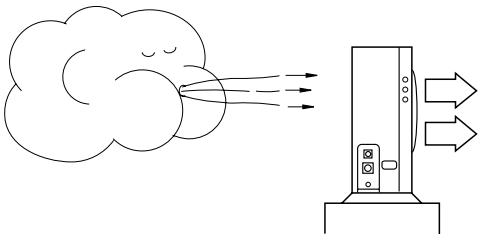


WITHOUT ANTI-SNOW GRIDS (LOW PLATFORM)

WITH ANTI-SNOW GRIDS (HIGH PLATFORM)

Orientation

Orient the unit in the direction of the predominant wind.



Clearances

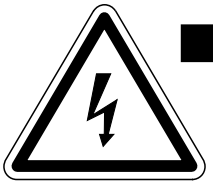
When installing each unit, clearances should be left for:
a) Air intake and discharge.
b) Maintenance servicing.
c) Power supply connections.
For proper operation, all minimum clearances shown on the general dimension diagrams should be respected always with regard to possible obstruction of air circulation or the work of a worker.

Wiring

Electrical connections

All established national regulations should be followed in all cases.

Each unit is supplied with a control box to which the power supply will be connected through a fused main switch or an automatic switch.



WARNING

Loose cables can cause overheating of terminals or incorrect operation of the unit. Fire hazards may also exist. Therefore, make sure all cables are connected firmly.

Rotational direction of Scroll compressors

The Scroll compressors operate correctly in one single rotational direction. Although these units are protected by a phase order detector, when starting the equipment make sure the rotational direction is correct.

If it is not correct:

- The compressor does not compress.
- It makes a strange sound.
- Amperage consumption is limited.
- It overheats in excess.

The phase detector must have both LEDs on for operation to be correct.

- Green LED on means: Power ON.
- Yellow LED on means: Relay ON.

Hydraulic connections

The hydraulic connections of the water intake and outlet of the unit should be carried out respecting the intake and outlet directions indicated.

A galvanised iron or copper tubing can be used, with dimensions no lower than those indicated, and keeping in mind the pressure drops at said connections and in the internal exchanger of the installation.

Pump dimensioning should be carried out in accordance with a nominal flow that allows an Δt within the operating limits.

In all cases, a flow switch should be installed so as to avoid the possibility of operation without water circulation.

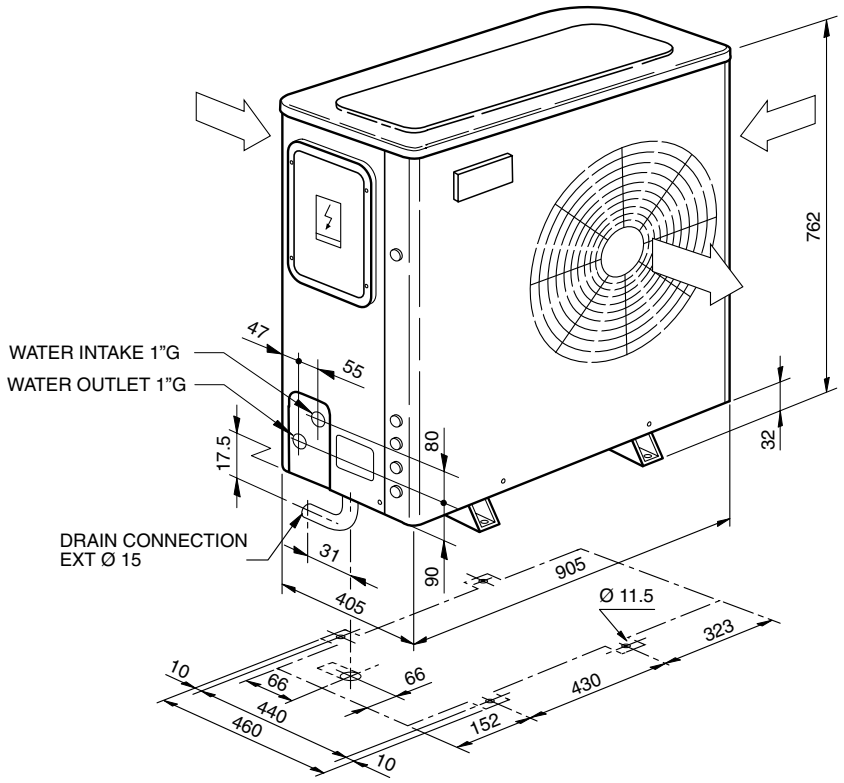
An adequate expansion vessel for the total volume of the water in the installation should also be installed in the water return tubing.

During the winter season, with outdoor temperatures below 0° C, take precautions to avoid freezing of the water in the tubing network.

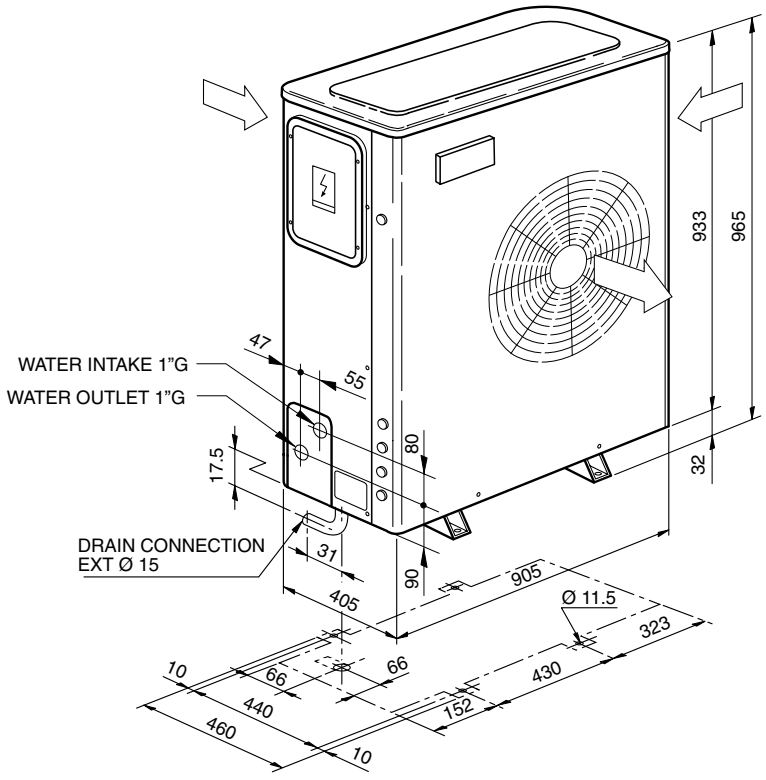
Usually, the solution is filling the circuit with an antifreeze mixture (glycol).

General dimensions mm and hydraulic connections

YLHA PLUS 5

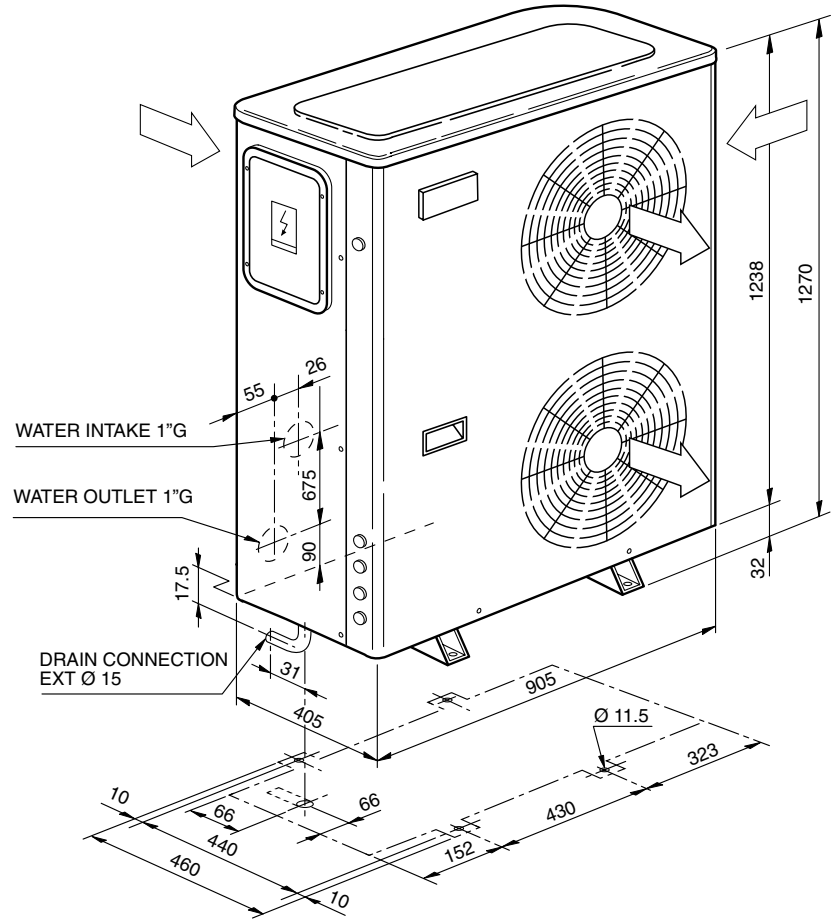


YLHA PLUS 7 and 9



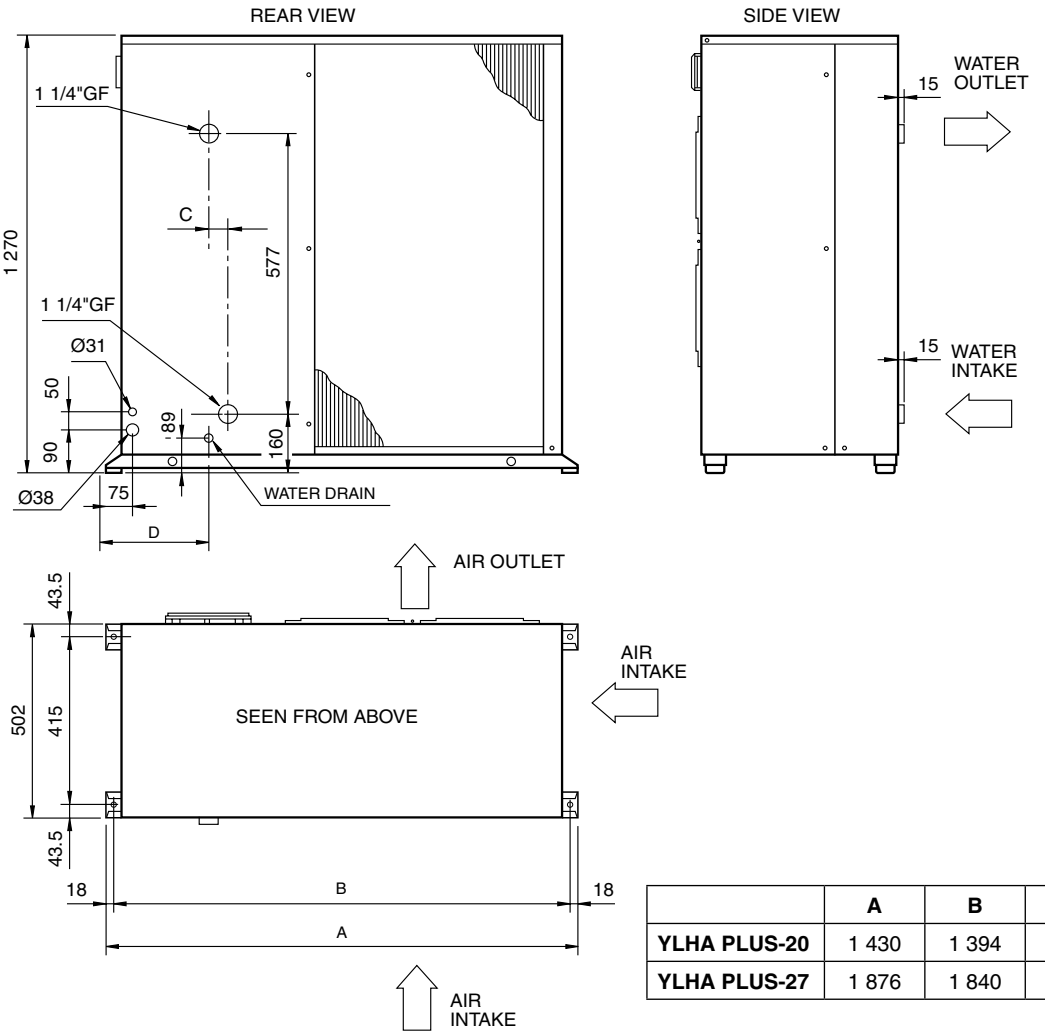
General dimensions mm and hydraulic connections

YLHA PLUS 12 and 15

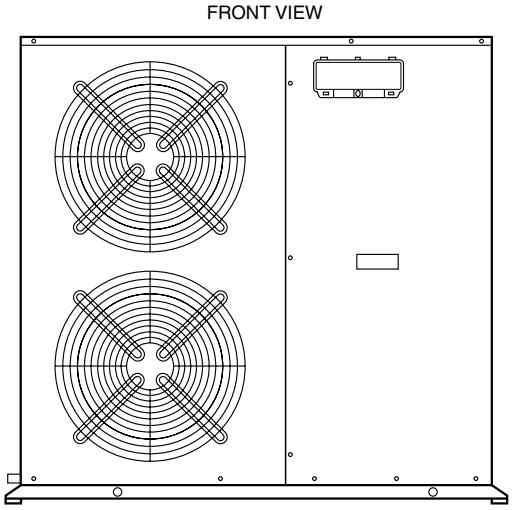


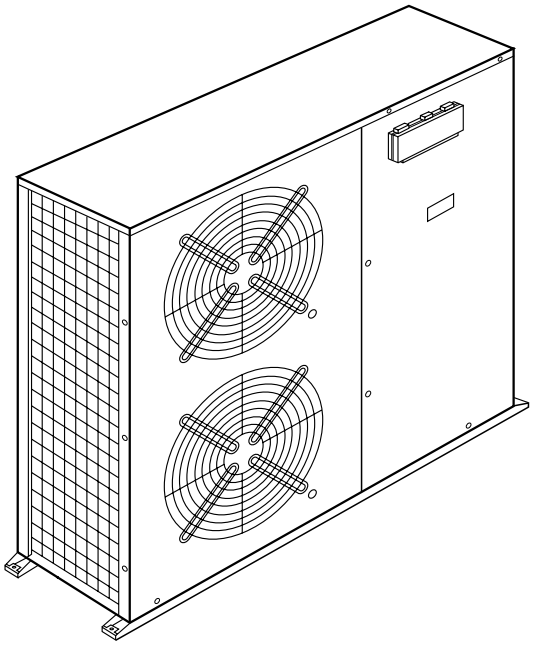
General dimensions mm and hydraulic connections

YLHA PLUS 20 and 27



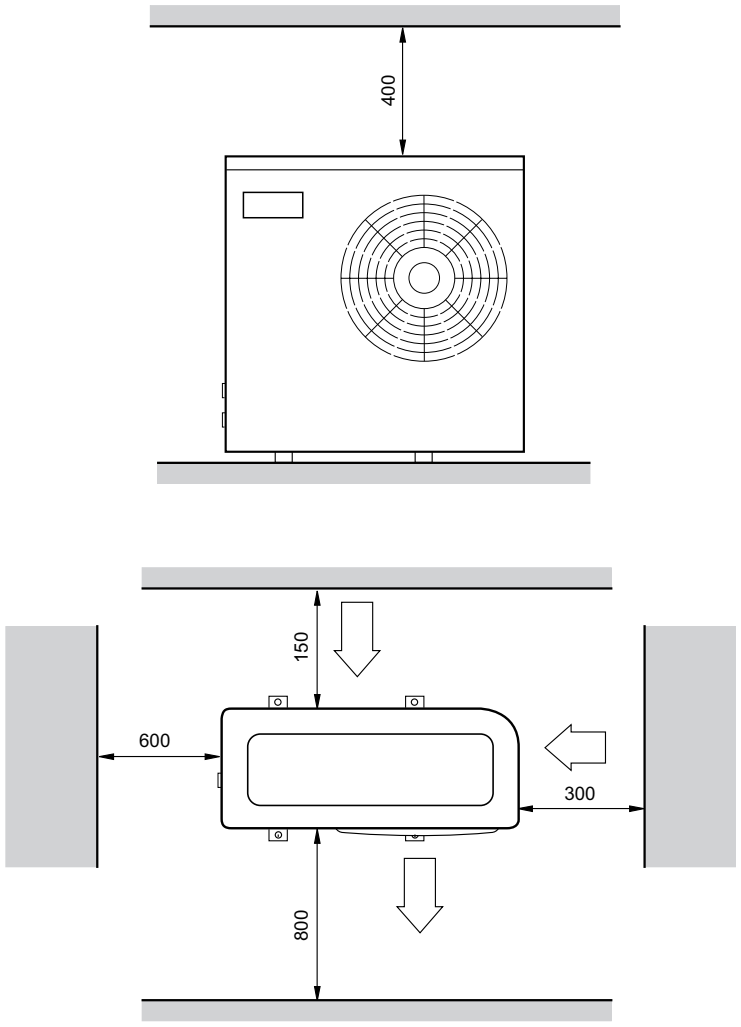
	A	B	C	D
YLHA PLUS-20	1 430	1 394	136	428
YLHA PLUS-27	1 876	1 840	144	432



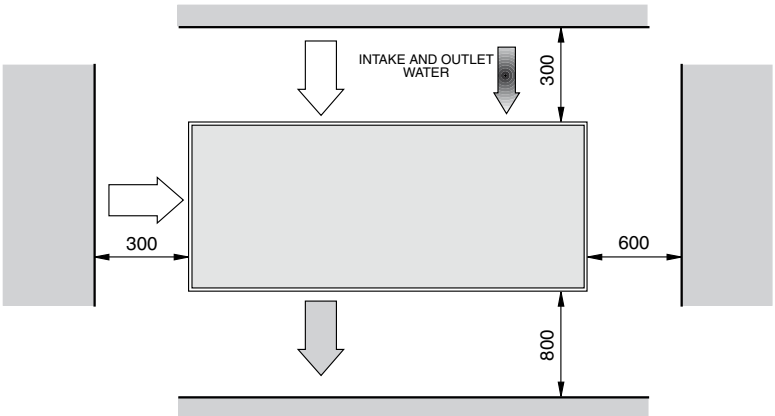


Minimum technical clearances

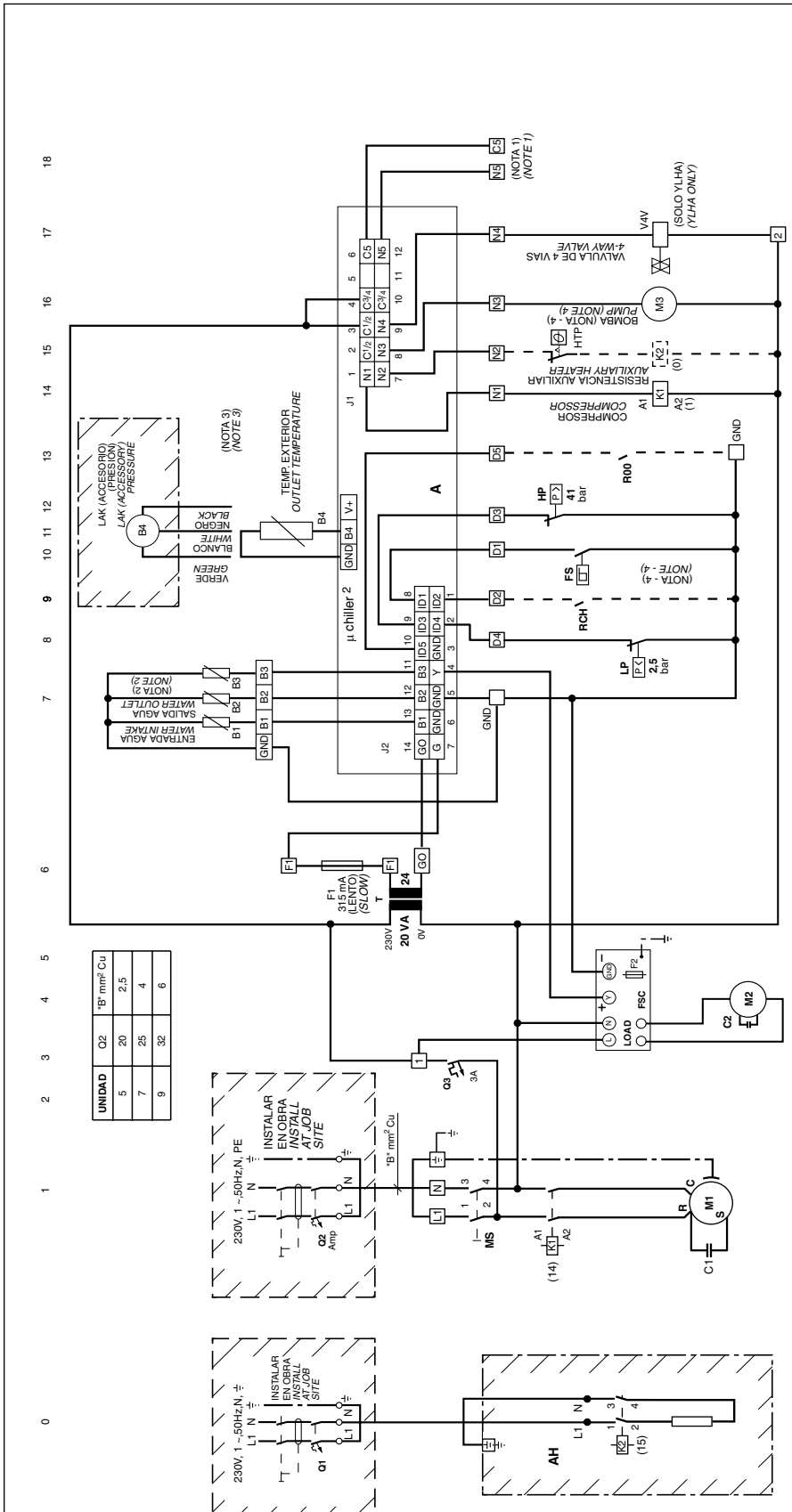
YLHA PLUS 5, 7, 9, 12 and 15



YLHA PLUS 20 and 27



Wiring diagram, YLCA/YLHA/YLHA PLUS 5, 7, 9 MC and M, 230.1.50



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LOS COMPONENTES INCLUIDOS EN ESTOS RECUADROS SON ACCESORIOS STANDARD SUMINISTRADOS POR EL FABRICANTE
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A CONTROL ELECTRÓNICO
ELECTRONIC CONTROL

AH RESISTENCIA AUXILIAR
AUXILIARY HEATER

B1 SONDA TEMPERATURA ENTRADA AGUA (NTC)
WATER INTAKE TEMPERATURE PROBE (NTC)

B2 SONDA TEMPERATURA SALIDA AGUA (NTC)
WATER OUTLET TEMPERATURE PROBE (NTC)

B3 SONDA TEMPERATURA (VER NOTA 2) (NTC)
TEMPERATURE PROBE (SEE NOTE 2) (NTC)

B4 (VER NOTA 3)
(SEE NOTE 3)

C1 CONDENSADOR COMPRESOR
COMPRESSOR CONDENSER

C2 CONDENSADOR VENTILADOR
FAN CONDENSER

F1 FUSIBLE PROTECCIÓN CONTROL ELECTRONICO / MANIOBRA 24V
24V ELECTRONIC CONTROL FUSE

F2 FUSIBLE PROTECCIÓN VARIADOR DE VELOCIDAD VENTILADOR
FAN SPEED CONTROLLER FUSE

FS CONTROL CAUDAL DE AGUA (UNIDADES MC)
WATER FLOW SWITCH (MC UNITS)

FSC VARIADOR VELOCIDAD VENTILADOR
FAN SPEED CONTROLLER

HP PRESOSTATO ALTA 41 BAR
HIGH PRESSURE SWITCH, 41 BAR

HTP PROTECTOR TÉRMICO RESISTENCIA
HEATER THERMAL PROTECTION

K1 CONTACTOR COMPRESOR
COMPRESSOR CONTACTOR

K2 CONTACTOR RESISTENCIA AUXILIAR
AUXILIARY HEATER CONTACTOR

LAK ACCESORIO LOW AMBIENT
KIT PRESOSTATICO
LOW AMBIENT KIT, ACCESSORY

LP PRESOSTATO BAJA 2,5 BAR
LOW PRESSURE SWITCH, 2.5BAR

M1 COMPRESOR
COMPRESSOR

M2 VENTILADOR
FAN

M3 BOMBA (UNIDADES MC)
PUMP (MC UNITS)

MS INTERRUPTOR GENERAL
MAIN SWITCH

Q1 PROTECTOR MAGNETOTÉRMICO RESISTENCIA APOYO
BACKUP HEATER MAGNETO THERMAL PROTECTOR

Q2 PROTECTOR MAGNETOTÉRMICO GENERAL / COMPRESOR
MAIN MAGNETO THERMAL PROTECTOR, COMPRESSOR

Q3 PROTECTOR MAGNETOTÉRMICO MANIOBRA GENERAL 230V / VENTILADOR / BOMBA / RESISTENCIA CARTER
MAIN OPERATING MAGNETO THERMAL PROTECTOR

R00 SELECTOR REMOTO PARO / MARCHA
ON/OFF REMOTE CONTROL

RCH SELECTOR REMOTO FRIO / CALOR
COOL/HEAT REMOTE CONTROL

T TRANSFORMADOR 230 / 24V 20VA
230 / 24V 20VA TRANSFORMER

V4V VALVULA DE 4 VIAS
4-WAY VALVE

NOTAS: ***NOTES:***

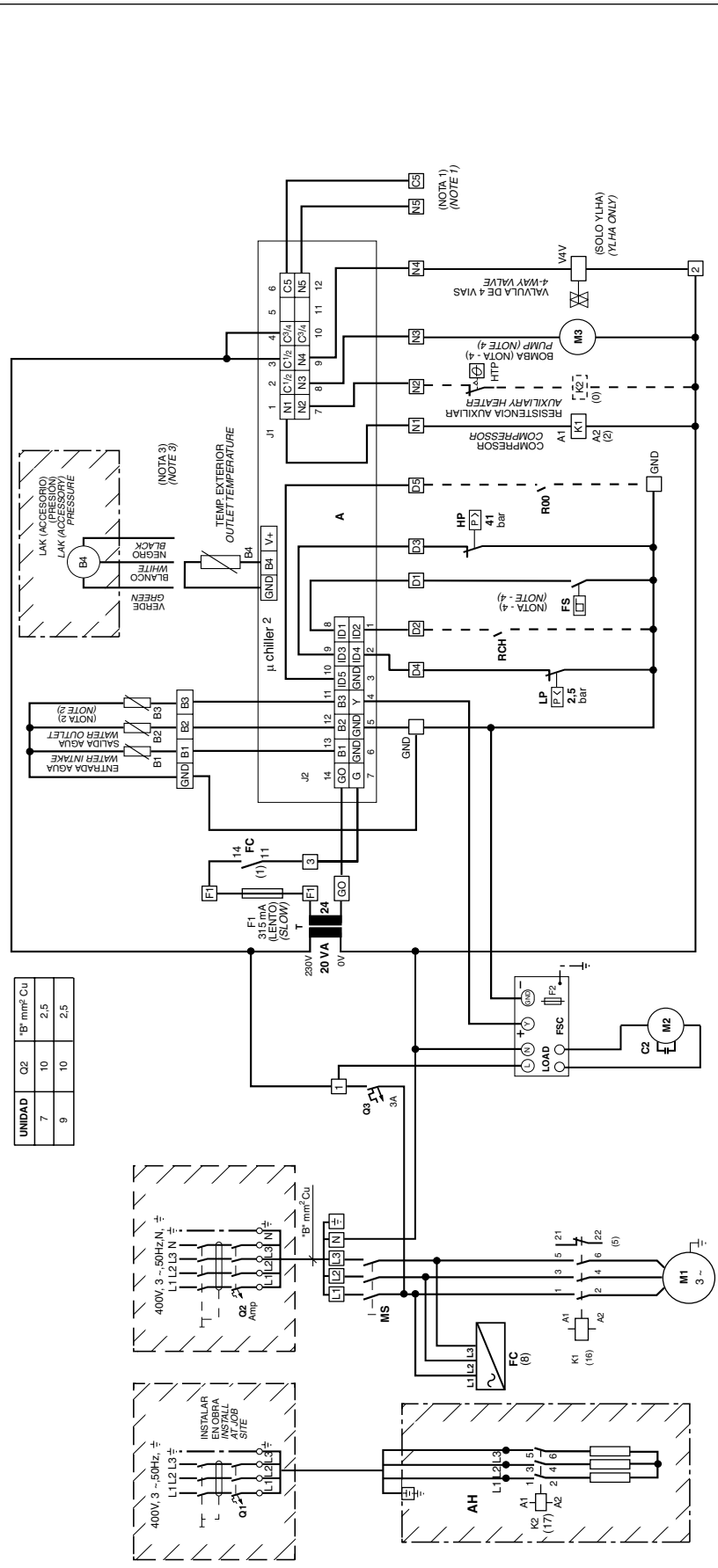
1.- ALARMA, CONTACTO NORMALMENTE ABIERTO LIBRE DE TENSIÓN (3A RESISTIVOS MÁXIMO)
ALARM,CONTACT NORMALLY OPEN, VOLT-FREE (3A. MAXIMUM RESISTANCE.)

2.- SONDA TEMPERATURA EXTERIOR EN UNIDADES CON LAK (NTC)
SONDA TEMPERATURA BATERIA EN UNIDADES ESTANDARD (NTC)
OUTDOOR TEMPERATURE PROBE ON UNITS WITH LAK (NTC)
COIL TEMPERATURE PROBE ON STANDARD UNITS (NTC)

3.- TRANSDUCTOR DE PRESION RACIOMETRICO EN UNIDADES CON LAK
SONDA TEMPERATURA EXTERIOR EN UNIDADES ESTANDARD (NTC)
RATIOMETRIC PRESSURE TRANSDUCER ON UNITS WITH LAK
OUTDOOR TEMPERATURE PROBE ON STANDARD UNITS (NTC)

4.- SOLO UNIDADES MC
MC UNITS ONLY

Wiring diagram, YLCA/YLHA/YLHA PLUS 7, 9 TC and T, 400.3.50



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LOS COMPONENTES INCLUIDOS EN ESTOS RECUADROS SON ACCESORIOS STANDARD SUMINISTRADOS POR EL FABRICANTE
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NOTAS: ***NOTES:***

1.- ALARMA. CONTACTO NORMALMENTE ABIERTO LIBRE DE TENSIÓN (3A,RESISTIVOS MÁXIMO)
ALARM.CONTACT NORMALLY OPEN, VOLT-FREE (3A, MAXIMUM RESISTANCE.)

2.- SONDA TEMPERATURA EXTERIOR EN UNIDADES CON LAK (NTC)
SONDA TEMPERATURA BATERIA EN UNIDADES ESTANDARD (NTC)
OUTDOOR TEMPERATURE PROBE ON UNITS WITH LAK (NTC)
COIL TEMPERATURE PROBE ON STANDARD UNITS (NTC)

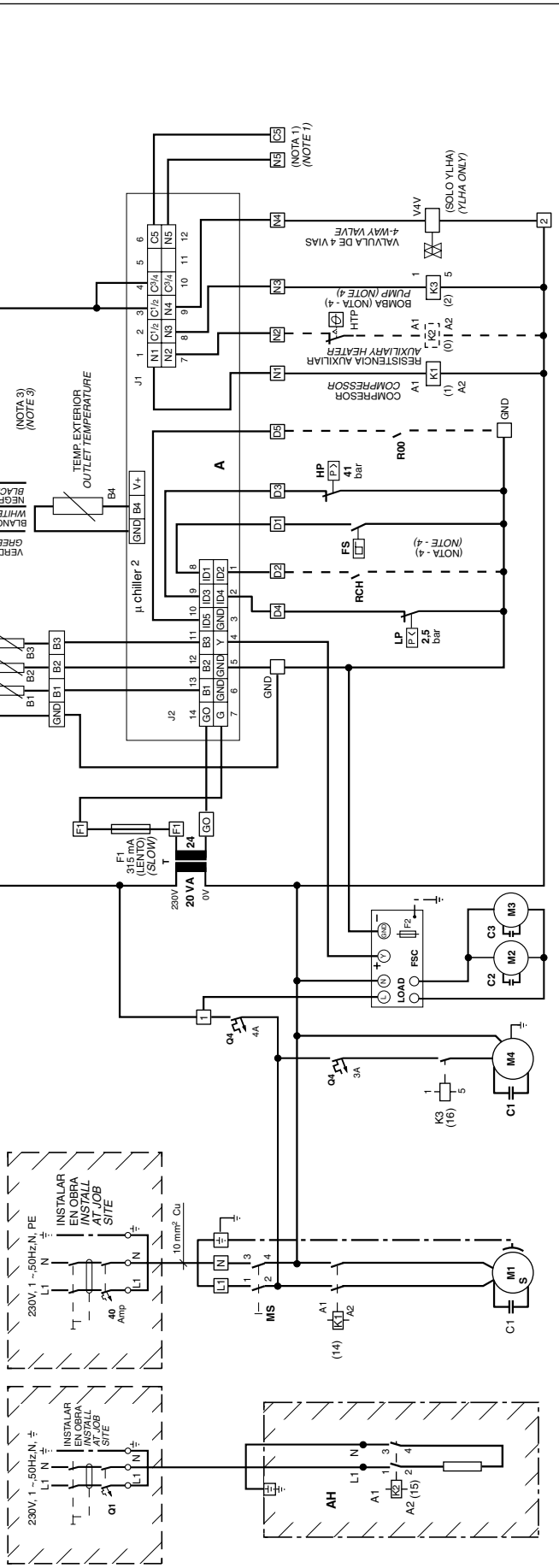
3.- TRANSDUCTOR DE PRESION RACIOMETRICO EN UNIDADES CON LAK
SONDA TEMPERATURA EXTERIOR EN UNIDADES ESTANDARD (NTC)
RATIOMETRIC PRESSURE TRANSDUCER ON UNITS WITH LAK.
OUTDOOR TEMPERATURE PROBE ON STANDARD UNITS (NTC)

4.- SOLO UNIDADES TC
TC UNITS ONLY

A	CONTROL ELECTRÓNICO *ELECTRONIC CONTROL*	**F1**	FUSIBLE PROTECCIÓN CONTROL ELECTRONICO / MANIOBRA 24V *24V ELECTRONIC CONTROL FUSE*	**K1**	CONTACTOR COMPRESOR *COMPRESSOR CONTACTOR*
AH	RESISTENCIA AUXILIAR *AUXILIARY HEATER*	**F2**	FUSIBLE PROTECCIÓN VARIADOR DE VELOCIDAD VENTILADOR *FAN SPEED CONTROLLER FUSE*	**K2**	CONTACTOR RESISTENCIA AUXILIAR *AUXILIARY HEATER CONTACTOR*
B1	SONDA TEMPERATURA ENTRADA AGUA (NTC) *WATER INTAKE TEMPERATURE PROBE (NTC)*	**FC**	CONTROL DE FASES *PHASE CONTROL*	**LAK**	ACCESORIO LOW AMBIENT KIT PRESOSTATICO *LOW AMBIENT KIT, ACCESSORY*
B2	SONDA TEMPERATURA SALIDA AGUA (NTC) *WATER OUTLET TEMPERATURE PROBE (NTC)*	**FS**	CONTROL CAUDAL DE AGUA (UNIDADES TC) *WATER FLOW SWITCH (TC UNITS)*	**LP**	PRESOSTATO BAJA 2,5 BAR *LOW PRESSURE SWITCH, 2.5BAR*
B3	SONDA TEMPERATURA (VER NOTA 2) (NTC) *TEMPERATURE PROBE (SEE NOTE 2) (NTC)*	**FSC**	VARIADOR VELOCIDAD VENTILADOR *FAN SPEED CONTROLLER*	**M1**	COMPRESOR *COMPRESSOR*
B4	(VER NOTA 3) *(SEE NOTE 3)*	**HP**	PRESOSTATO ALTA 41 BAR *HIGH PRESSURE SWITCH, 41 BAR*	**M2**	VENTILADOR 1 *FAN 1*
C2	CONDENSADOR VENTILADOR *FAN CONDENSER*	**HTP**	PROTECTOR TÉRMICO RESISTENCIA *HEATER THERMAL PROTECTION*	**M3**	BOMBA (UNIDADES TC) *PUMP (TC UNITS)*
C2	CONDENSADOR VENTILADOR *FAN CONDENSER*				

MS	INTERRUPTOR GENERAL *MAIN SWITCH*	**Q1**	PROTECTOR MAGNETOTÉRMICO RESISTENCIA APOYO *BACKUP HEATER MAGNETO THERMAL PROTECTOR*	**Q2**	PROTECTOR MAGNETOTÉRMICO GENERAL / COMPRESOR *MAIN MAGNETO THERMAL PROTECTOR, COMPRESSOR*
	MAIN OPERATING MAGNETO THERMAL PROTECTOR, 220V/FAN/PUMP. SUMP HEATER	**R00**	SELECTOR REMOTO PARO / MARCHA *ON/OFF REMOTE CONTROL*	**RCH**	SELECTOR REMOTO FRIO / CALOR *COOL/HEAT REMOTE CONTROL*
		T	TRANSFORMADOR 230 / 24V 20VA *230 / 24V 20VA TRANSFORMER*	**V4V**	VALVULA DE 4 VIAS *4-WAY VALVE*

Wiring diagram, YLCA/YLHA/YLHA PLUS 12 MC and M, 230.1.50



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A CONTROL ELECTRÓNICO
ELECTRONIC CONTROL

AH RESISTENCIA AUXILIAR
AUXILIARY HEATER

B1 SONDA TEMPERATURA ENTRADA AGUA (NTC)
WATER INTAKE TEMPERATURE PROBE (NTC)

B2 SONDA TEMPERATURA SALIDA AGUA (NTC)
WATER OUTLET TEMPERATURE PROBE (NTC)

B3 SONDA TEMPERATURA (VER NOTA 2) (NTC)
TEMPERATURE PROBE (SEE NOTE 2) (NTC)

B4 (VER NOTA 3)
(SEE NOTE 3)

C2, C3 CONDENSADOR VENTILADOR
FAN CONDENSER

F1 FUSIBLE PROTECCIÓN CONTROL ELECTRÓNICO / MANIOBRA 24V
24V ELECTRONIC CONTROL FUSE

F2 FUSIBLE PROTECCIÓN VARIADOR DE VELOCIDAD VENTILADOR
FAN SPEED CONTROLLER FUSE

FS CONTROL CAUDAL DE AGUA (UNIDADES MC)
WATER FLOW SWITCH (MC UNITS)

FSC VARIADOR VELOCIDAD VENTILADOR
FAN SPEED CONTROLLER

HP PRESOSTATO ALTA 41 BAR
HIGH PRESSURE SWITCH, 41 BAR

HTP PROTECTOR TÉRMICO RESISTENCIA
HEATER THERMAL PROTECTION

K1 CONTACTOR COMPRESOR
COMPRESSOR CONTACTOR

K2 CONTACTOR RESISTENCIA AUXILIAR
AUXILIARY HEATER CONTACTOR

K3 CONTACTOR BOMBA (UNIDADES TC)
PUMP CONTACTOR (TC UNITS)

LAK ACCESORIO LOW AMBIENT KIT PRESOSTATICO
LOW AMBIENT KIT, ACCESSORY

LP PRESOSTATO BAJA 2,5 BAR
LOW PRESSURE SWITCH, 2.5BAR

M1 COMPRESOR
COMPRESSOR

M2 VENTILADOR 1
FAN 1

M3 VENTILADOR 2
FAN 2

M4 BOMBA (UNIDADES MC)
PUMP (MC UNITS)

MS INTERRUPTOR GENERAL
MAIN SWITCH

Q1 PROTECTOR MAGNETOTÉRMICO RESISTENCIA APOYO
BACKUP HEATER MAGNETO THERMAL PROTECTOR

Q2 PROTECTOR MAGNETOTÉRMICO GENERAL / COMPRESOR
MAIN MAGNETO THERMAL PROTECTOR, COMPRESSOR

Q3 PROTECTOR MAGNETOTÉRMICO MANIOBRA GENERAL 230V / VENTILADOR / BOMBA / RESISTENCIA CARTER
MAIN OPERATING MAGNETO THERMAL PROTECTOR, 220V/FAN/PUMP, SUMP HEATER

Q4 PROTECTOR MAGNETOTÉRMICO BOMBA (UNIDADES TC)
PUMP MAGNETO THERMAL PROTECTOR, (TC UNITS)

R00 SELECTOR REMOTO PARO / MARCHA
ON/OFF REMOTE CONTROL

RCH SELECTOR REMOTO FRIO / CALOR
COOL/HEAT REMOTE CONTROL

T TRANSFORMADOR 230 / 24V 20VA
230 / 24V 20VA TRANSFORMER

V4V VALVULA DE 4 VIAS
4-WAY VALVE

NOTAS: ***NOTES:***

1.- ALARMA. CONTACTO NORMALMENTE ABIERTO LIBRE DE TENSIÓN (3A RESISTIVOS MAXIMO).
ALARM. CONTACT NORMALLY OPEN, VOLT-FREE (3A. MAXIMUM RESISTANCE.)

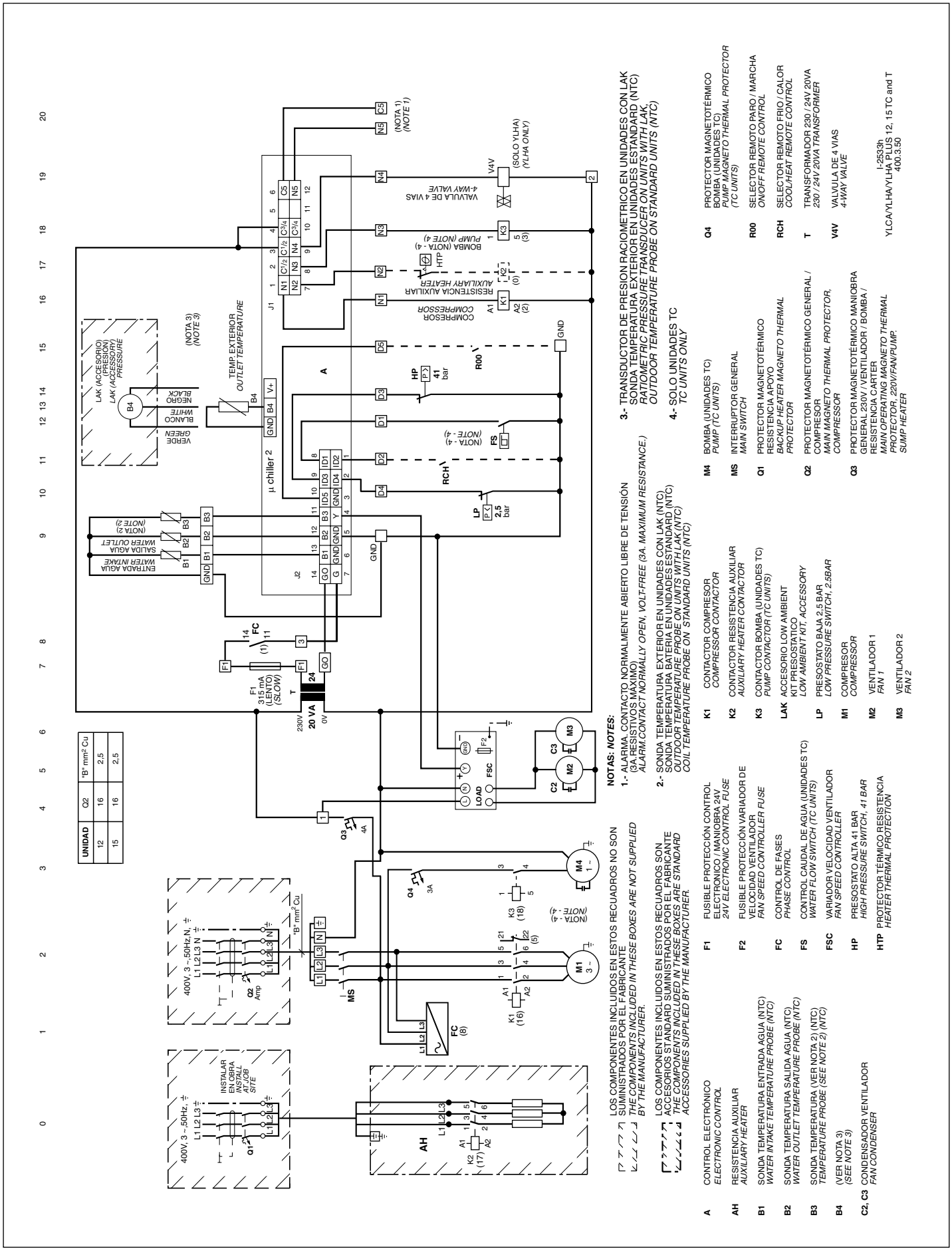
2.- SONDA TEMPERATURA EXTERIOR EN UNIDADES CON LAK (NTC).
SONDA DE TEMPERATURA BATERIA EN UNIDADES ESTANDARD (NTC).
OUTDOOR TEMPERATURE PROBE ON UNITS WITH LAK (NTC)
COIL TEMPERATURE PROBE ON STANDARD UNITS (NTC)

3.- TRANSDUCTOR DE PRESION RACIOMETRICO EN UNIDADES CON LAK
SONDA TEMPERATURA EXTERIOR EN UNIDADES ESTANDARD (NTC)
RATIOMETRIC PRESSURE TRANSDUCER ON UNITS WITH LAK,
OUTDOOR TEMPERATURE PROBE ON STANDARD UNITS (NTC)

4.- SOLO UNIDADES MC
MC UNITS ONLY

I-2584b
YLCA/YLHA/YLHA PLUS 12 MC and M
230.1.50

Wiring diagram, YLCA/YLHA/YLHA PLUS 12 and 15 TC and T, 400.3.50



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NOTAS: ***NOTES:***

1.- ALARMA. CONTACTO NORMALMENTE ABIERTO LIBRE DE TENSIÓN (3A.RESISTIVOS MÁXIMO)
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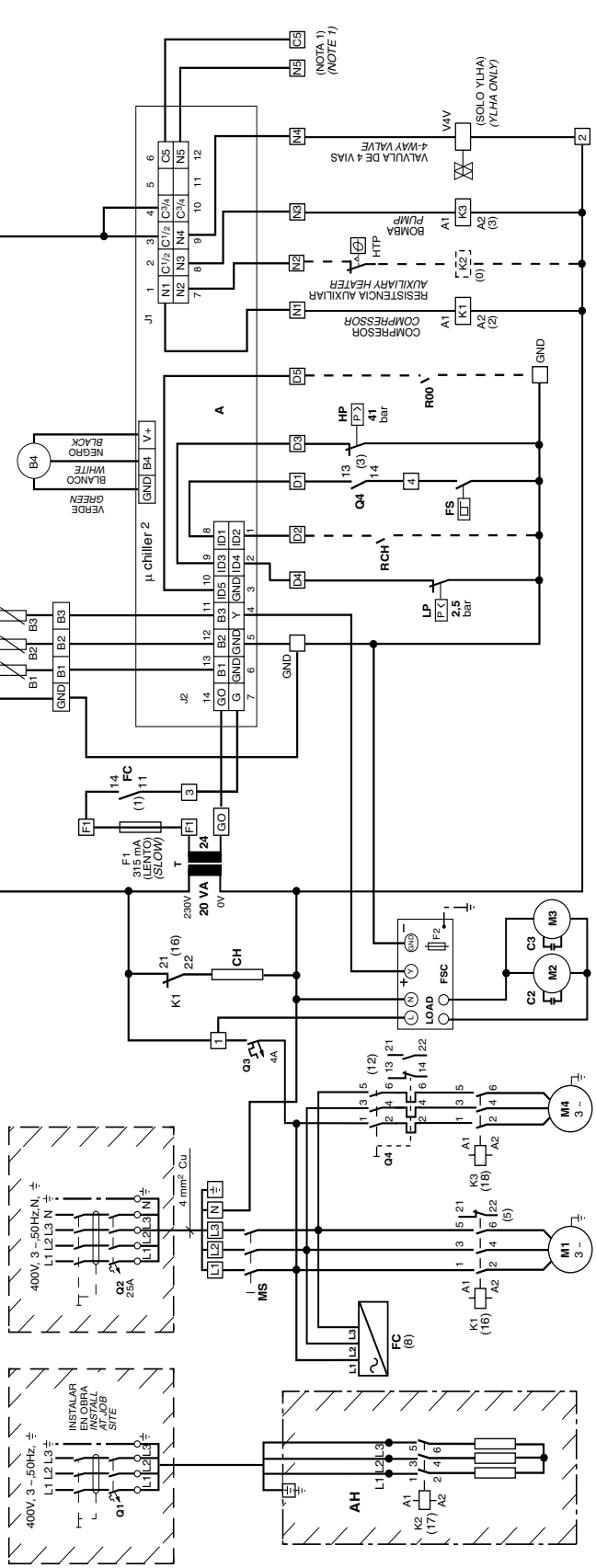
2.- SONDA TEMPERATURA EXTERIOR EN UNIDADES CON LAK (NTC)
SONDA TEMPERATURA BATERIA EN UNIDADES ESTANDARD (NTC)
OUTDOOR TEMPERATURE PROBE ON UNITS WITH LAK (NTC)
COIL TEMPERATURE PROBE ON STANDARD UNITS (NTC)

3.- TRANSDUCTOR DE PRESION RACIOMETRICO EN UNIDADES CON LAK
SONDA TEMPERATURA EXTERIOR EN UNIDADES ESTANDARD (NTC)
RATIOMETRIC PRESSURE TRANSDUCER ON UNITS WITH LAK.
OUTDOOR TEMPERATURE PROBE ON STANDARD UNITS (NTC)

4.- SOLO UNIDADES TC
TC UNITS ONLY

A	CONTROL ELECTRÓNICO *ELECTRONIC CONTROL*	**F1**	FUSIBLE PROTECCIÓN CONTROL ELECTRONICO / MANIOBRA 24V *24V ELECTRONIC CONTROL FUSE*	**K1**	CONTACTOR COMPRESOR *COMPRESSOR CONTACTOR*
AH	RESISTENCIA AUXILIAR *AUXILIARY HEATER*	**F2**	FUSIBLE PROTECCIÓN VARIADOR DE VELOCIDAD VENTILADOR *FAN SPEED CONTROLLER FUSE*	**K2**	CONTACTOR RESISTENCIA AUXILIAR *AUXILIARY HEATER CONTACTOR*
B1	SONDA TEMPERATURA ENTRADA AGUA (NTC) *WATER INTAKE TEMPERATURE PROBE (NTC)*	**FC**	CONTROL DE FASES *PHASE CONTROL*	**K3**	CONTACTOR BOMBA (UNIDADES TC) *PUMP CONTACTOR (TC UNITS)*
B2	SONDA TEMPERATURA SALIDA AGUA (NTC) *WATER OUTLET TEMPERATURE PROBE (NTC)*	**FS**	CONTROL CAUDAL DE AGUA (UNIDADES TC) *WATER FLOW SWITCH (TC UNITS)*	**LAK**	ACCESORIO LOW AMBIENT KIT PRESOSTATICO *LOW AMBIENT KIT, ACCESSORY*
B3	SONDA TEMPERATURA (VER NOTA 2) (NTC) *TEMPERATURE PROBE (SEE NOTE 2) (NTC)*	**FSC**	VARIADOR VELOCIDAD VENTILADOR *FAN SPEED CONTROLLER*	**LP**	PRESOSTATO BAJA 2,5 BAR *LOW PRESSURE SWITCH, 2.5BAR*
B4	(VER NOTA 3) *(SEE NOTE 3)*	**HP**	PRESOSTATO ALTA 41 BAR *HIGH PRESSURE SWITCH, 41 BAR*	**M1**	COMPRESOR *COMPRESSOR*
C2, C3	CONDENSADOR VENTILADOR *FAN CONDENSER*	**HTP**	PROTECTOR TÉRMICO RESISTENCIA *HEATER THERMAL PROTECTION*	**M2**	VENTILADOR 1 *FAN 1*
				M3	VENTILADOR 2 *FAN 2*
				M4	BOMBA (UNIDADES TC) *PUMP (TC UNITS)*
				MS	INTERRUPTOR GENERAL *MAIN SWITCH*
				Q1	PROTECTOR MAGNETOTÉRMICO RESISTENCIA APOYO *BACKUP HEATER MAGNETO THERMAL PROTECTOR*
				Q2	PROTECTOR MAGNETOTÉRMICO GENERAL / COMPRESOR *MAIN MAGNETO THERMAL PROTECTOR, COMPRESSOR*
				Q3	PROTECTOR MAGNETOTÉRMICO MANIOBRA GENERAL 230V / VENTILADOR / BOMBA / RESISTENCIA CARTER *MAIN OPERATING MAGNETO THERMAL PROTECTOR, 220V/FAN/PUMP. SUMP HEATER*
				Q4	PROTECTOR MAGNETOTÉRMICO BOMBA (UNIDADES TC) *PUMP MAGNETO THERMAL PROTECTOR (TC UNITS)*
				R00	SELECTOR REMOTO PARO / MARCHA *ON/OFF REMOTE CONTROL*
				RCH	SELECTOR REMOTO FRIO / CALOR *COOL/HEAT REMOTE CONTROL*
				T	TRANSFORMADOR 230 / 24V 20VA *230 / 24V 20VA TRANSFORMER*
				V4V	VALVULA DE 4 VIAS *4-WAY VALVE*

Wiring diagram, YLCA/YLHA 20 TC and T, YLHA PLUS-27, 400.3.50



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NOTAS: ***NOTES:***

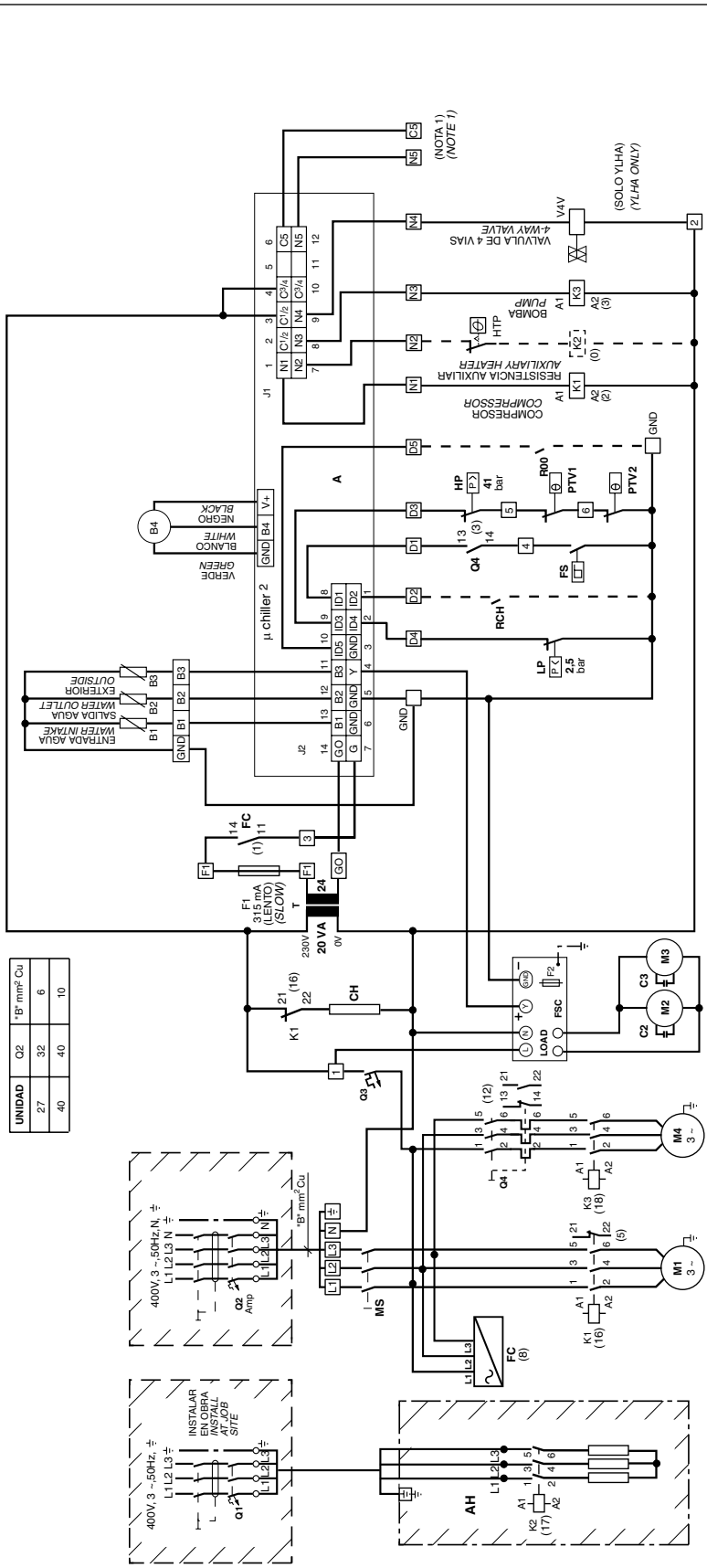
1.- ALARMA: CONTACTO NORMALMENTE ABIERTO LIBRE DE TENSIÓN (3A RESISTIVOS MÁXIMO)
ALARM CONTACT NORMALLY OPEN, VOLT-FREE (3A. MAXIMUM RESISTANCE.)

2.- SOLO UNIDADES TC
TC UNITS ONLY

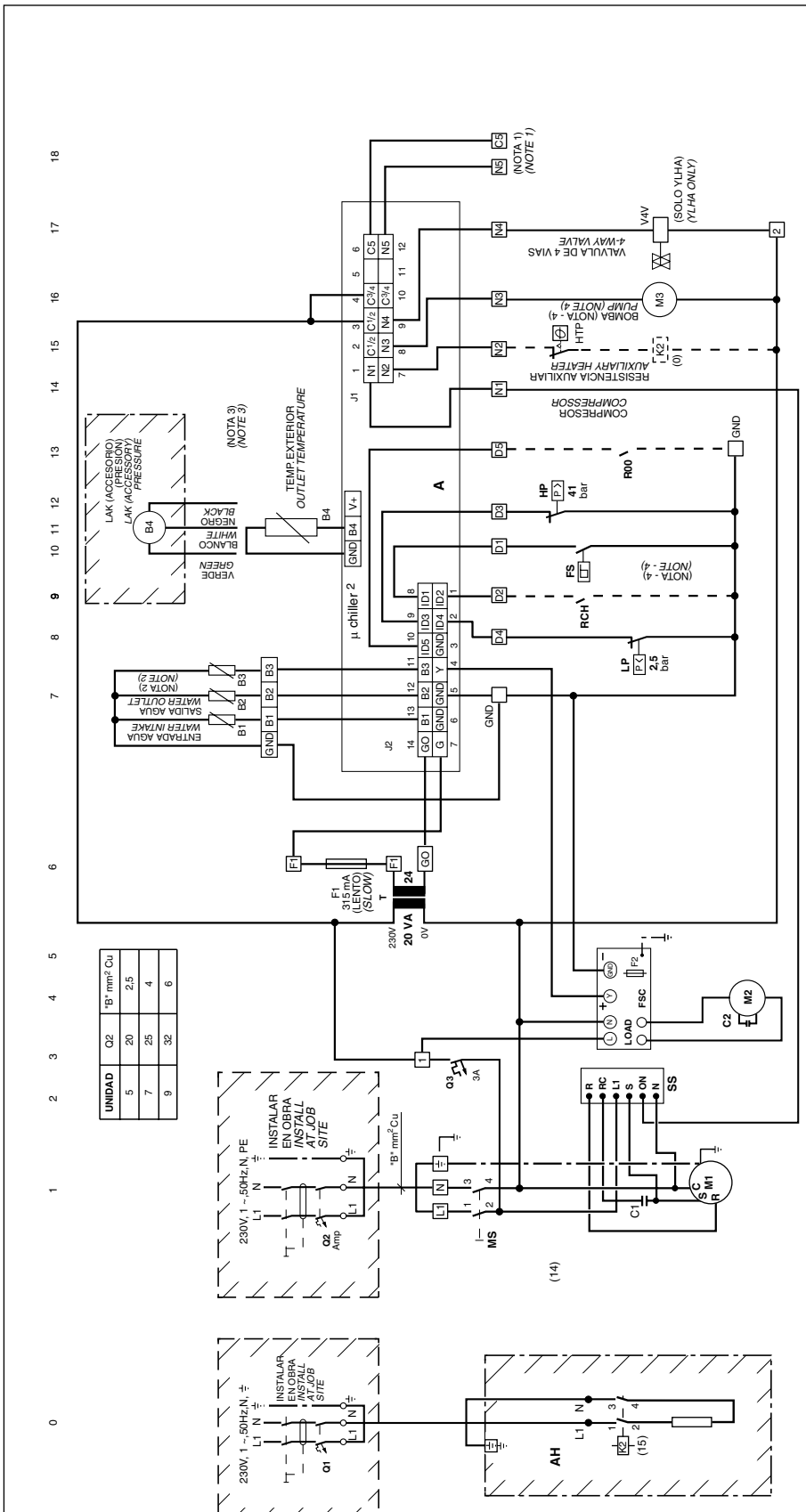
I-2534f
YLCA/YLHA/YLHA PLUS 20 TC and T
400.3.50

A	CONTROL ELECTRÓNICO *ELECTRONIC CONTROL*	**C2, C3**	CONDENSADOR VENTILADOR *FAN CONDENSER*
AH	RESISTENCIA AUXILIAR *AUXILIARY HEATER*	**CH**	RESISTENCIA CARTER COMPRESOR *COMPRESSOR SUMP HEATER*
B1	SONDA TEMPERATURA ENTRADA AGUA (NTC) *WATER INTAKE TEMPERATURE PROBE (NTC)*	**F1**	FUSIBLE PROTECCIÓN CONTROL ELECTRONICO / MANIOBRA 24V *24V ELECTRONIC CONTROL FUSE*
B2	SONDA TEMPERATURA SALIDA AGUA (NTC) *WATER OUTLET TEMPERATURE PROBE (NTC)*	**F2**	FUSIBLE PROTECCIÓN VARIADOR DE VELOCIDAD VENTILADOR *FAN SPEED CONTROLLER FUSE*
B3	SONDA TEMPERATURA EXTERIOR (NTC) *OUTSIDE TEMPERATURE PROBE (NTC)*	**FC**	CONTROL DE FASES *PHASE CONTROL*
B4	SONDA DE PRESIÓN RACIOMÉTRICA CONTROL VELOCIDAD VENTILADORES/ DESESCARCHES *RATIOMETRIC PRESSURE PROBE FAN SPEED CONTROL DEFROSTS (ACCESSORY)*	**FS**	CONTROL CAUDAL DE AGUA (UNIDADES TC) *WATER FLOW SWITCH (TC UNITS)*
		FSC	VARIADOR VELOCIDAD VENTILADOR *FAN SPEED CONTROLLER*
		HP	PRESOSTATO ALTA 41 BAR *HIGH PRESSURE SWITCH, 41 BAR*
		HTP	PROTECTOR TÉRMICO RESISTENCIA *HEATER THERMAL PROTECTION*
		K1	CONTACTOR COMPRESOR *COMPRESSOR CONTACTOR*
		K2	CONTACTOR RESISTENCIA AUXILIAR *AUXILIARY HEATER CONTACTOR*
		K3	CONTACTOR BOMBA (UNIDADES TC) *PUMP CONTACTOR (TC UNITS)*
		LAK	ACCESORIO LOW AMBIENT KIT PRESOSTÁTICO *LOW AMBIENT KIT, ACCESSORY*
		LP	PRESOSTATO BAJA 2,5 BAR *LOW PRESSURE SWITCH, 2.5BAR*
		M1	COMPRESOR *COMPRESSOR*
		M2	VENTILADOR 1 *FAN 1*
		M3	VENTILADOR 2 *FAN 2*
		M4	BOMBA (UNIDADES TC) *PUMP (TC UNITS)*
		MS	INTERRUPTOR GENERAL *MAIN SWITCH*
		Q1	PROTECTOR MAGNETOTÉRMICO *BACKUP HEATER MAGNETO THERMAL PROTECTOR*
		Q2	PROTECTOR MAGNETOTÉRMICO GENERAL / COMPRESOR *MAIN MAGNETO THERMAL PROTECTOR, COMPRESSOR*
		Q3	PROTECTOR MAGNETOTÉRMICO, MANIOBRA GENERAL 230V / VENTILADOR / BOMBA / RESISTENCIA CARTER *MAIN OPERATING MAGNETO THERMAL PROTECTOR, 220V/FAN/PUMP S UMP HEATER*
		Q4	PROTECTOR MAGNETOTÉRMICO BOMBA (UNIDADES TC) *PUMP MAGNETO THERMAL PROTECTOR (TC UNITS)*
		R00	SELECTOR REMOTO PARO / MARCHA *ON/OFF REMOTE CONTROL*
		RCH	SELECTOR REMOTO FRIO / CALOR *COOL/HEAT REMOTE CONTROL*
		T	TRANSFORMADOR 230 / 24V 20VA *230 / 24 V 20VA TRANSFORMER*
		V4V	VALVULA DE 4 VIAS *4-WAY VALVE*

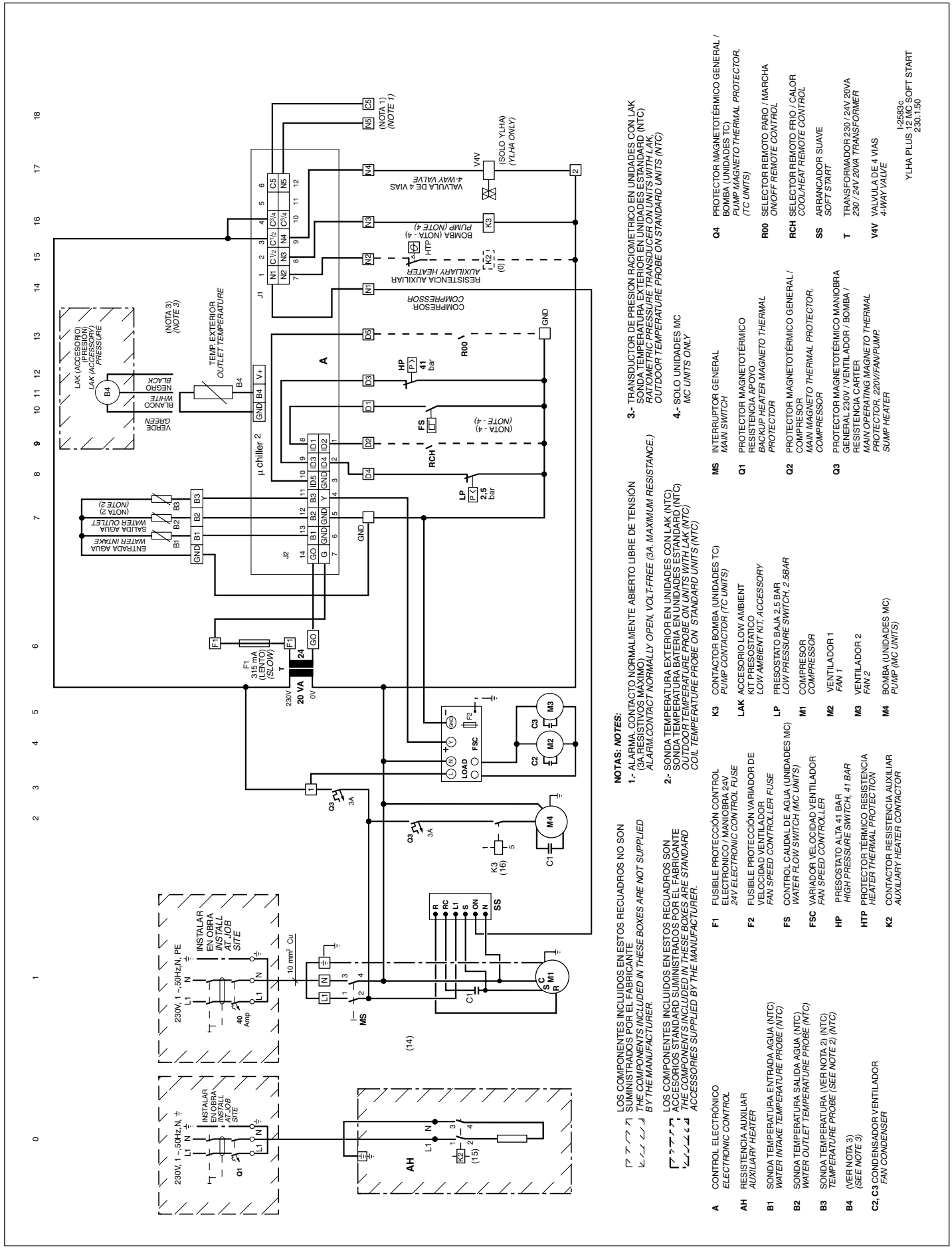
Wiring diagram, YLCA/YLHA/YLHA 27, 40 TC and T, 400.3.50



Wiring diagram, YLCA PLUS 5, 7, 9 MC, 230.1.50 SOFT START

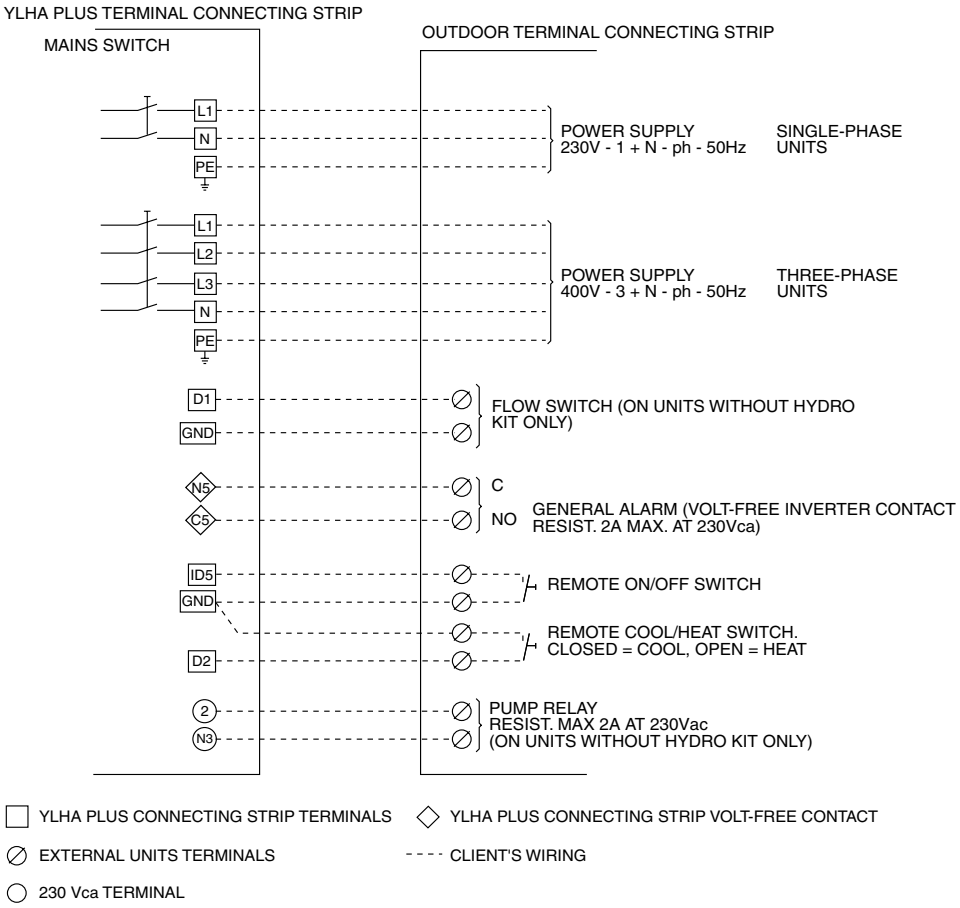


Wiring diagram, YLCA PLUS 12 MC, 230.1.50 SOFT START



Wiring

YLHA PLUS 5 to 27



Electrical characteristics

Mode	Power supply V.ph.Hz.	Compressor						Fans		Pump	
		Nominal A		Start A		Nominal kW		Nominal	Nominal	Nominal	Nominal
		Cool	Heat	STD	SOFT START	Cool	Heat	A	W	A	W
YLHA PLUS 5	230.1.50	8.4	8.1	60	<45	1.77	1.76	0.6	140	0.65	160
YLHA PLUS 7		11.7	11.2	82	<45	2.41	2.30	0.8	170	0.95	210
YLHA PLUS 9		16.3	14.8	97	<45	3.29	2.98				
YLHA PLUS 12		18.6	17.1	116	<52	3.9	3.55			1.8	400
YLHA PLUS 9	400.3.50	6	5.8	48		3.29	2.98			0.95	210
YLHA PLUS 12		6.36	6.38	51		3.80	3.77	2 x 0.87	2 x 185	1.8	400
YLHA PLUS 15		8.7	8.2	74		5.13	4.81			2.15	490
YLHA PLUS 20		11.7	10.8	95		6.71	6.06	2 x 0.8	2 x 180	1.1	390
YLHA PLUS 27		15.1	14.3	118		8.47	8.32	2 x 1.30	2 x 200	1.34	755

Limits of use

Model	Voltage limits		Entering air temperature to coil DB				Water output temperature				Temperature dif. between water output and intake	
	Nominal at 400		Operating cycle				Operating cycle					
			Minimum°C		Maximum °C		Minimum °C		Maximum °C		Minimum °C	Maximum °C
	Minimum	Maximum	Cool	Heat	Cool	Heat	Cool	Heat	Cool	Heat		
YLHA PLUS	342	436	-10 (2)	-15	46	20	5 (1)	30	15	50 (3)	3	7

(1) At lower water temperatures, it is advisable to use glycol type antifreeze mixtures. Minimum temperature with glycol -5° C. (2) -18° C with low temperature kit (optional) on YLHA PLUS 5 to 20 models, and standard on YLHA PLUS 20 and 27 models. (3) 50° C if intake air is over 0° C.

Prior to final approval of the installation

Check:
- Voltage is always between 342 - 436 V.
- Power supply cable section is, at least, as indicated on the corresponding wiring diagrams.

- The warrantee card has been filled out.

- Maintenance instructions have been given, or a regular maintenance contract has been signed.
- Operating instructions have been given to the user.

Operating instructions µC2 (Rev. 1016)

Description of the control unit

This is a multipurpose controller specially programmed for use with air-water chillers and heat pumps equipped with one single power stage compressor.

Main functions

- Water temperature control (at intake or outlet, as per parameter r6).
- Defrost cycle management.
- System operating and safety management.
- Fan speed control.
- Alarm management.
- Connection for supervision and telephone assistance (access serial connection RS485).

Devices controlled

- Compressor
- Fans
- Four-way valve
- Water pump
- Alarm device
- Auxiliary heater

Standard components

- ***Control module.*** - This is the central nucleus that processes the signals coming from the probes and protection elements of the entire system to control its active elements: compressor and fans, four-way valve, water circulating pump, alarm relay and auxiliary heater. Power supply is 24 Vac.

  Can also be used for access and control of the system by means of the display, buttons and LEDs available. Allows selection of cool, heat and off functions. Operating parameters can also be modified, and the system can be supervised as well.

- ***Fan speed control module.***
  Operates by phase cut-off. Includes fuse.

- ***NTC and ratiometric (pressure) probes.***
  YLHA 5 is 15 standard.
  4 NTC probes are used to read system temperatures:
  B1. Controls set point. Reads water temperature at exchanger intake.
  B2. Antifreeze control. Reads water temperature at exchanger discharge.
  B3. Fan speed and defrost cycle control. Reads refrigerant temperature inside the coil.
  B4. Dynamic set point control. Reads outdoor air temperature.

  YLHA 5 to 15 LAK (low temperature kit) and 20 to 40 standard.
  3 NTC probes are used to read system temperatures and a ratiometric pressure transducer (B4) to read refrigerant pressure inside the coil:
  B1. Controls set point. Reads water temperature at exchanger intake.
  B2. Antifreeze control. Reads water temperature at exchanger discharge.
  B3. Controls dynamic set point. Reads outdoor air temperature.
  B4. Fan speed and defrost cycle control. Reads refrigerant pressure inside the coil.

Parameters

The set of parameters that configure the operating program of the unit is divided into four levels *(Factory, Super, User and Direct)*, depending upon the function of each parameter and the user's access level. The parameters of each level can be modified from that same level, as well as lower level parameters.

***Factory* level**

Accessible with the *Factory password*. Allows configuration of all unit parameters.

***Super User* level**

Accessible with *Super User password*. Allows setting *Super User, User and Direct* parameters.

***User* level**

Accessible with *password 22*. Allows access to all parameters the user normally sets.

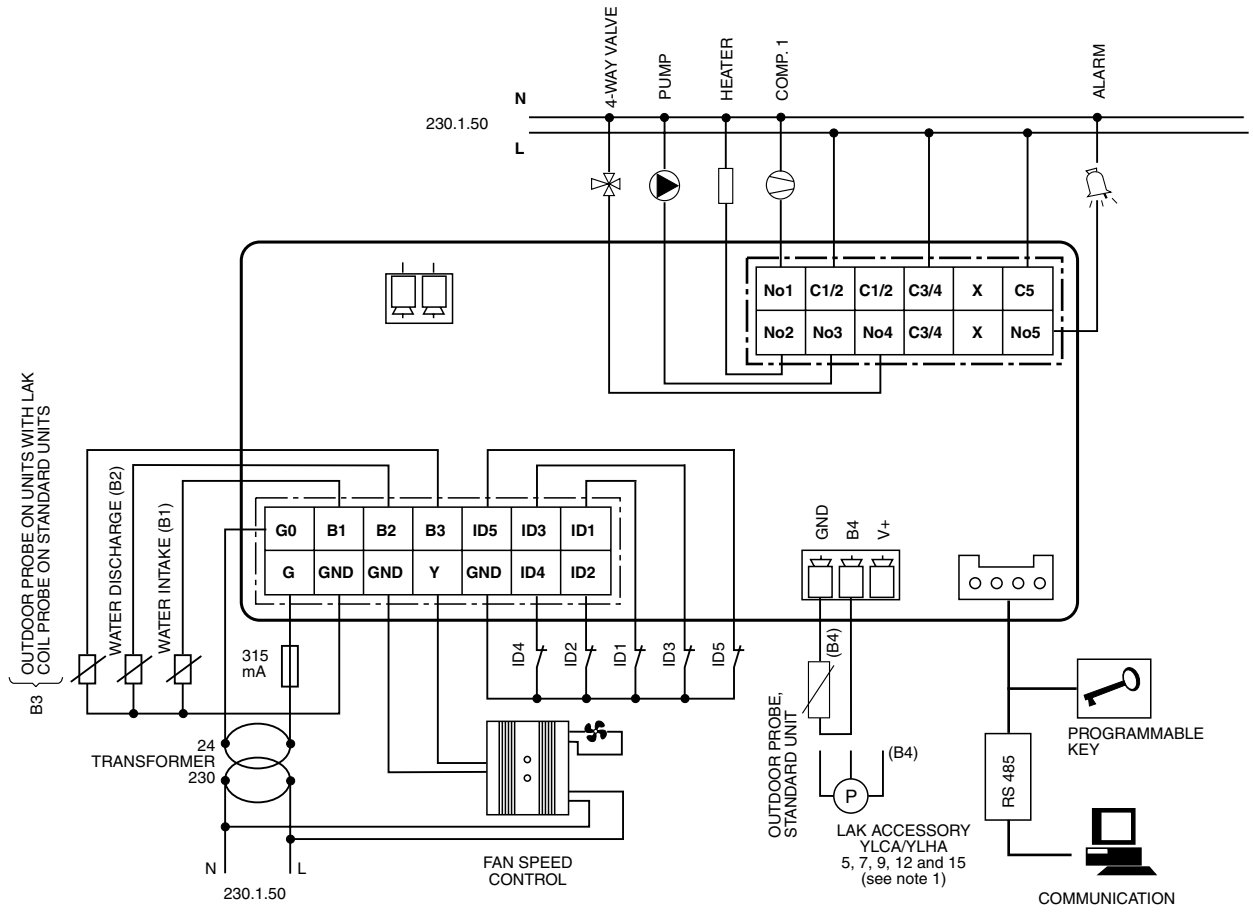
***Direct* level**

Accessible without a *password*. Allows reading the values detected by the probes, as well as other system values. Can be used by the user without affecting unit operation.

General

Modification of the parameters that affect basic unit configuration should be made with the controller in Standby position.

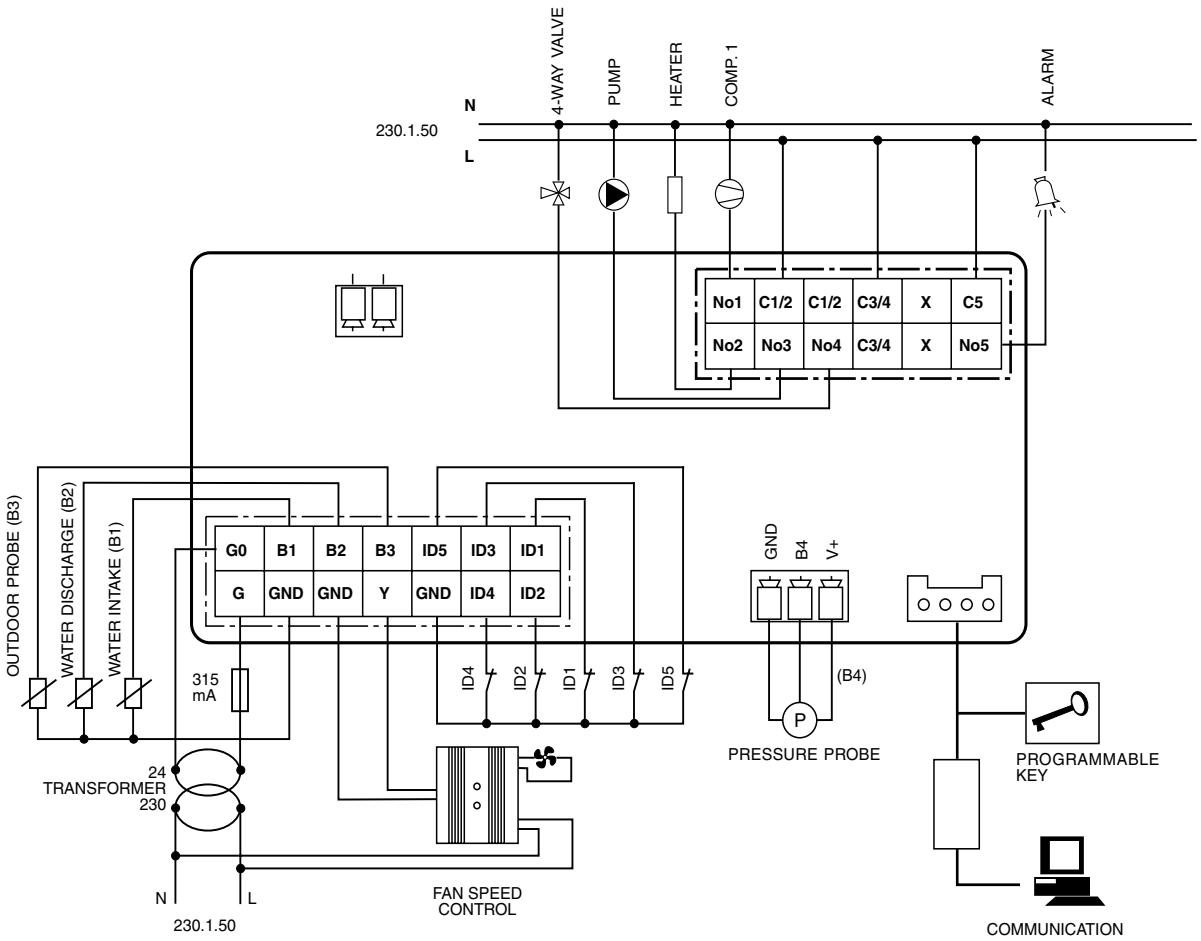
General diagram, YLHA PLUS 5, 7, 9, 12 and 15



B1: WATER INTAKE TEMPERATURE PROBE (SET POINT CONTROL)
B2: WATER DISCHARGE TEMPERATURE PROBE (ANTIFREEZE PROTECTION)
B3: COIL TEMPERATURE PROBE (FAN SPEED AND DEFROST CONTROL)
B4: OUTDOOR TEMPERATURE PROBE (DYNAMIC SET POINT)
ID1. WATER FLOW SWITCH
ID2. REMOTE COOL/HEAT
ID3. HIGH PRESSURE SWITCH
ID4. LOW PRESSURE SWITCH
ID5. REMOTE ON/OFF

NOTE 1.- WHEN THE LOW AMBIENT KIT IS INSTALLED, B4 PROBE MUST BE CONFIGURED AS A PRESSURE TRANSDUCER, AND B3 AS AN OUTDOOR TEMPERATURE NTC PROBE.

General diagram, YLHA PLUS 20 and 27

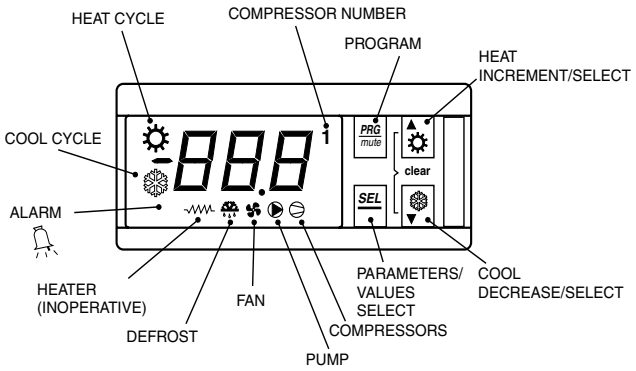


B1. WATER INTAKE TEMPERATURE PROBE (SET POINT CONTROL)
B2. WATER DISCHARGE TEMPERATURE PROBE (ANTIFREEZE PROTECTION)
B3. COIL TEMPERATURE PROBE (FAN SPEED AND DEFROST CONTROL)
B4. OUTDOOR TEMPERATURE PROBE (DYNAMIC SET POINT)
ID1. WATER FLOW SWITCH
ID2. REMOTE COOL/HEAT
ID3. HIGH PRESSURE SWITCH
ID4. LOW PRESSURE SWITCH
ID5. REMOTE ON/OFF

Display symbols

The display has three figures in green, plus a symbol and a decimal. It also shows the symbols, in amber, of the functions selected (the alarm symbol (-) is red).

Symbol	Colour	Meaning	
		With LED on permanently	With LED flashing
1	Amber	Compressor in operation	Timing start-up
		Compressors under call	-
		Water pump in operation	-
		Fans in operation	-
		Defrost active	-
	Red	Alarm active	-
	Amber	Cool cycle	-
		Heat cycle	-



Functions of remote control unit buttons

BUTTON	UNIT STATUS	PRESSING
Prg/mute	Loads values by default	Applies voltage when pressed
	Return to superior sub-group within programming area until output of same (except changes in E2PROM)	Simply press
Sel	Access to *Direct* parameters	Press for 5 seconds
	Selects a *Direct* parameter and shows its value / Confirms parameter changes	Simply press
Prg+Sel	Programming parameters with *password*	Press for 5 seconds
▲	Selects superior parameter within the programming area	Simply press or continue
	Increase value	Simply press or continue
	Selects heat function from standby position and vice-versa (P6=1)	Press for 5 seconds
▼	Selects lower parameter within programming area	Simply press or continue
	Lower value	Simply press or continue
	Selects cool function from standby position and vice-versa (P6=1)	Press for 5 seconds
▼ + ▲	Manual alarm reset	Press for 5 seconds
	Clears hour counters (within programming area)	Press for 5 seconds
SEL +	Forced manual defrost	Press for 5 seconds

Location of controls

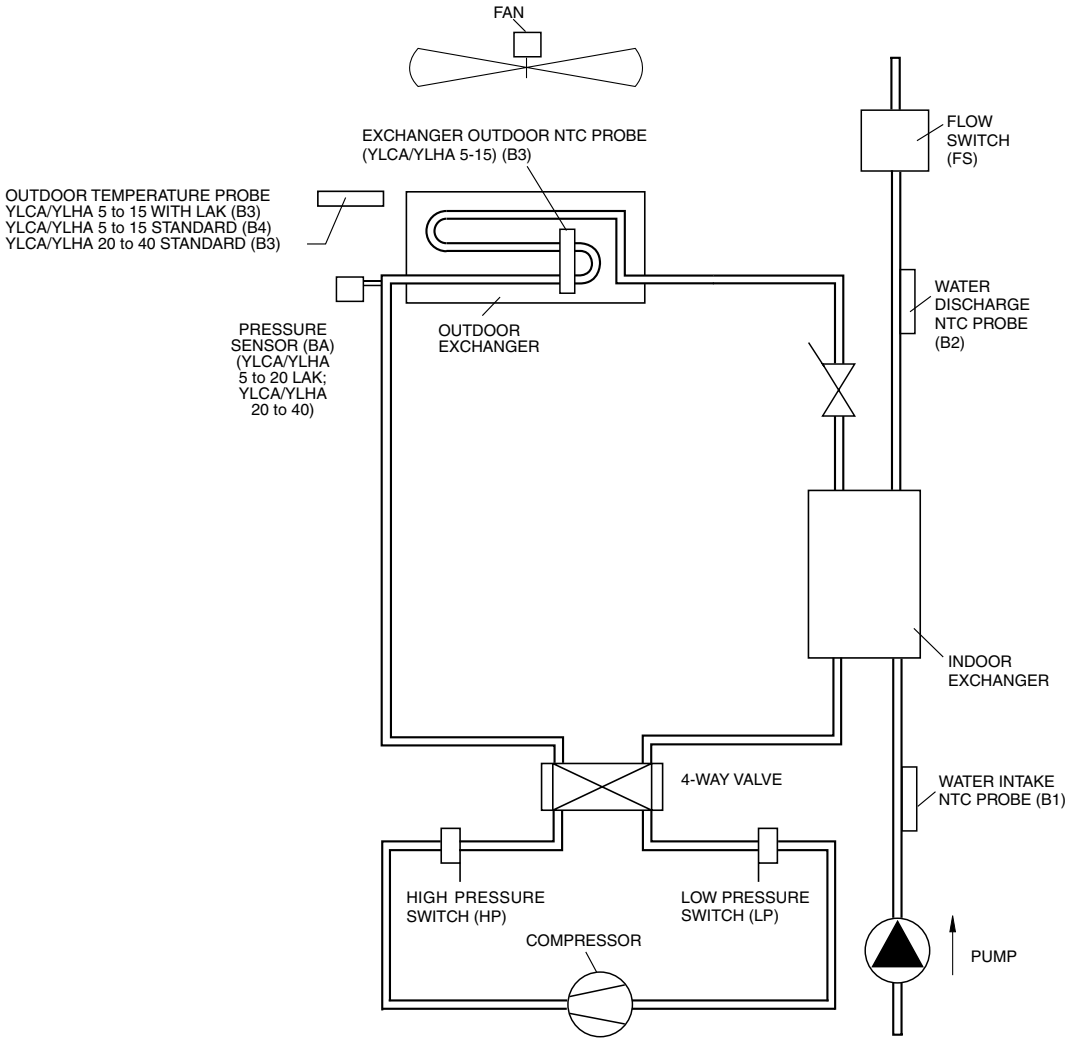


Table of parameters

The following tables show the parameters and their values divided into groups.

Parameter level codes

D = *Direct*
U = *User*
S = *Super User*
F = *Factory*

Variables for supervision (VS)

R/W = Read/write parameter
R = Read only parameter

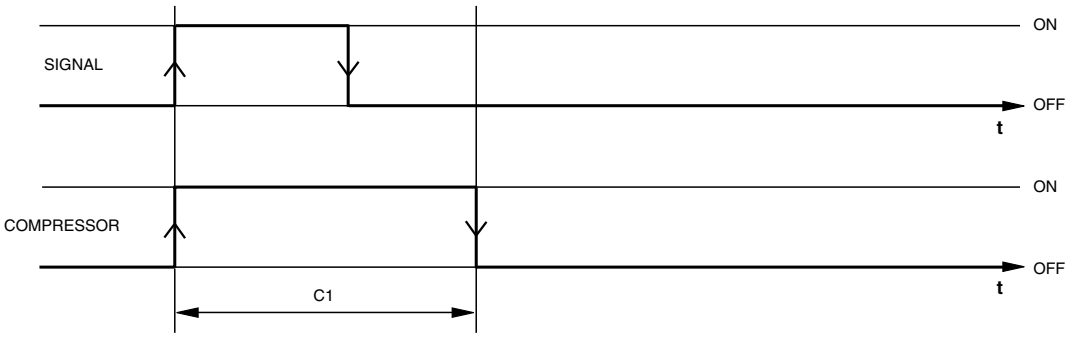
Parameters related to the probes							
Display	**Description**	**Level**	**VS**	**Unit**	**Max.**	**Min.**	**Value**
/01	NTC B1 probe (water intake); 0=absent (function not available). 1=present	F	1 (R/W)	-	1	0	**1**
/02	NTC B2 probe (water outlet). 0=absent (function not available). 1=present	F	2 (R/W)	-	1	0	**1**
/03	NTC B3 probe . 1=condensation probe. 2=outdoor probe.	F	14 (R/W)	-	1	0	**(a)**
/04	Probe type B4. 0=absent. 1=ON/OFF. 2=outdoor NTC probe. 3=ratiometric 5Vdc.	F	15 (R/W)	-	3	0	**(b)**
/09	Minimum input voltage	F	18 (R/W)	0.01 Vdc	/10	0	**50**
/10	Maximum input voltage	F	19 (R/W)	0.01 Vdc	500	/09	**450**
/11	Minimum pressure	F	1 (R/W)	bar	/12	0	**0**
/12	Maximum pressure	F	2 (R/W)	bar	99.9	/11	**45**
/13	Calibration probe B1	F	3 (R/W)	°C	12	-12	**0**
/14	Calibration probe B2	F	4 (R/W)	°C	12	-12	**0**
/15	Calibration probe B3	F	5 (R/W)	°C	12	-12	**0**
/16	Calibration probe B4	F	6 (R/W)	bar	12	-12	**0**
/21	Digital filter	U	20 (R/W)	-	15	1	**4**
/22	Input limitation	U	21 (R/W)	-	15	1	**8**
/23	Measuring unit 0 = C; 1 = 1F	U	5 (R/W)	-	1	0	**0**
b00	Probe viewed on display	U	24 (R/W)	-	7	0	**0**
b01	Value read by probe B1	D	70 (R)	°C	-	-	**-**
b02	Value read by probe B2	D	71 (R)	°C	-	-	**-**
b03	Value read by probe B3	D	72 (R)	°C	-	-	**-**
b04	Value read by probe B4	D	73 (R)	°C/bar	-	-	**-**

(a) YLHA PLUS 5 to 15 /03=1; YLHA PLUS 5 to 15 LAK 03/=2; YLHA PLUS 20 to 40 03/=2.
(b) YLHA PLUS 5 to 15 /04=2; YLHA PLUS 5 to 15 LAK 04/=3, YLHA PLUS 20 to 40 04/=3.

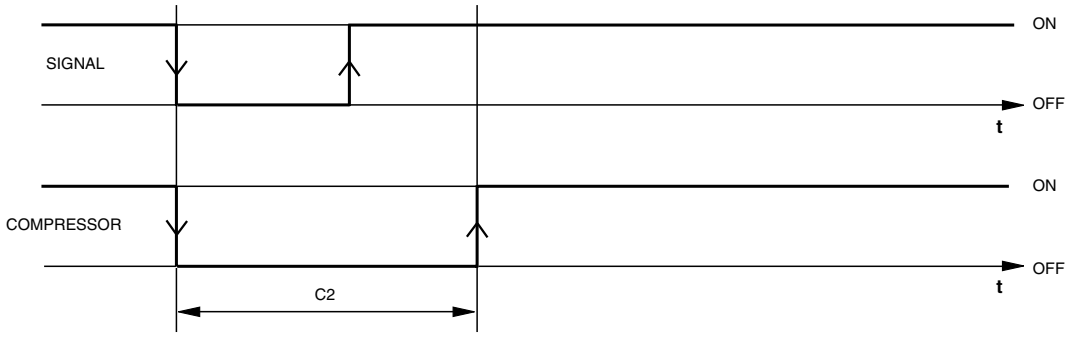
Parameters related to compressor							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
c01	Minimum operating time	U	25 (R/W)	Sec.	999	0	**60**
c02	Minimum OFF time	U	26 (R/W)	Sec.	999	0	**60**
c03	Time between start-ups of the same compressor	U	27 (R/W)	Sec.	999	0	**300 (a)** **240 (b)**
c06	Start-up timing	U	30 (R/W)	Sec.	999	0	**10**
c07	Compressor start-up delay with regard to the pump	U	31 (R/W)	Sec.	150	0	**20**
c08	Pump OFF delay with regard to the compressor	U	32 (R/W)	Min.	150	0	**1**
c10	Operating hour counter for compressor	D	90 (R)	Hours	800	0	-
c14	Operating hour counter for compressor maintenance	U	34 (R/W)	Hours	100	0	**0**
c15	Operating hour counter for pump	D	94 (R/W)	Hours	800	0	-
c17	Minimum time between pump start-ups	U	35 (R/W)	Min.	150	0	**5**
c18	Minimum operating time for pump	U	36 (R/W)	Min.	15	0	**1**

(a) Units without SOFT START.
(b) Units with SOFT START.

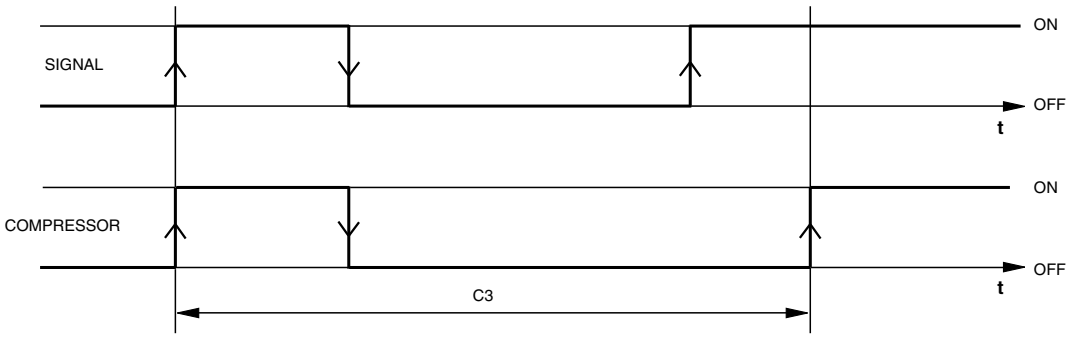
Minimum operating time of a compressor



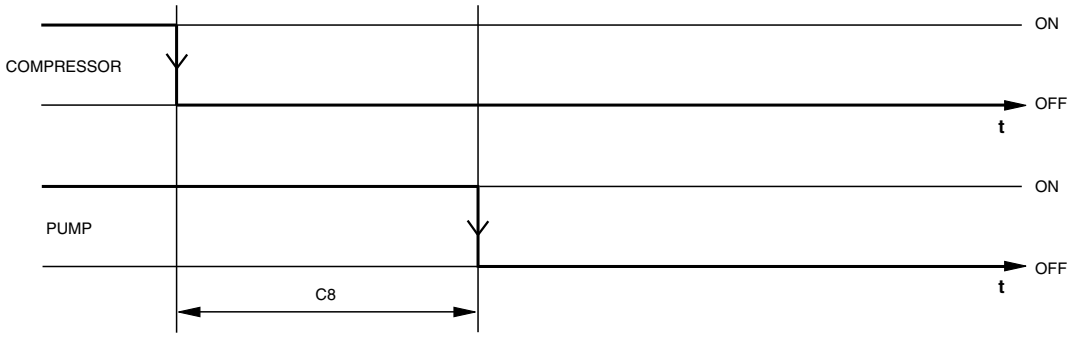
Minimum OFF time of a compressor



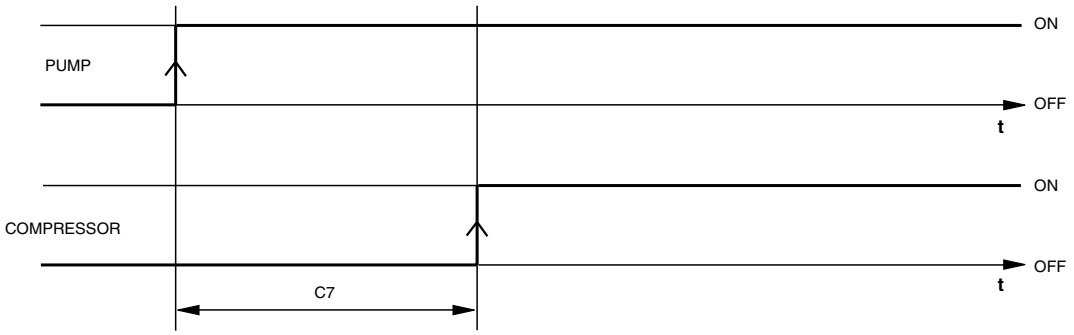
Minimum time between compressor start-ups



Compressor/pump OFF delays

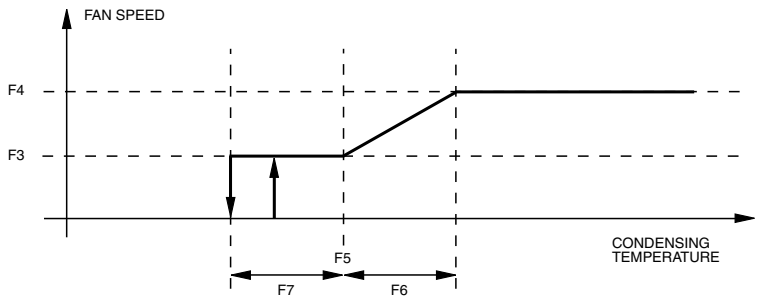


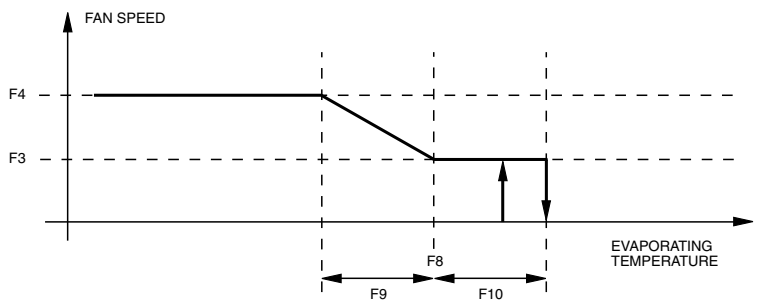
Pump/compressor start-up delays



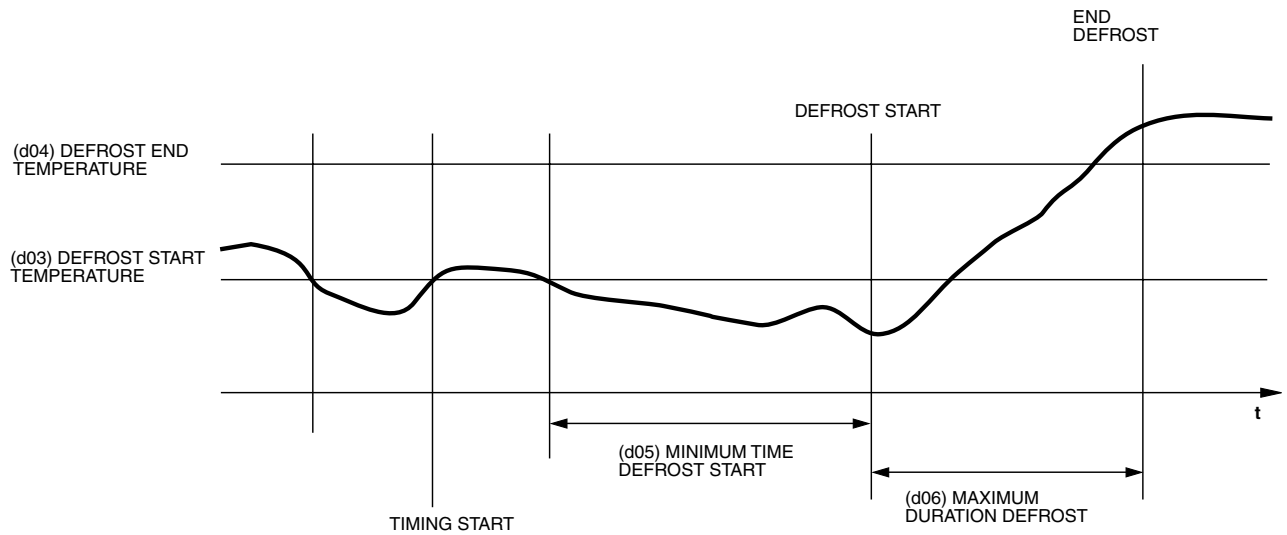
Parameters related to the fans							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
F01	Fan outlet. 0=absent (function not available); 1=present	F	10 (R/W)		1	0	**1**
F02	Operating mode: 0= always ON (function not available) 1= Parallel with compressor (function not available) 2= ON/OFF operation (function not available) 3= Parallel with compressor and speed adjustment.	U	48 (R/W)		3	0	**3**
F03	Minimum triac voltage	F	49 (R/W)	step	F04	0	**50**
F04	Maximum triac voltage	F	50 (R/W)	step	100	F03	**75**
F05	Cold cycle minimum speed temperature Cool cycle minimum speed pressure (1)	F	24 (R/W)	°C bar	80	-40	**38** **22.2**
F06	Cool cycle maximum speed temp. differential Cool cycle maximum speed pressure differential (1)	F	26 (R/W)	°C bar	50	0	**7** **3.7**
F07	Cool cycle fan OFF differential Cool cycle fan OFF pressure differential (1)	F	28 (R/W)	°C bar	50	0	**13** **6.5**
F08	Heat cycle minimum speed temperature Heat cycle minimum speed pressure (1)	F	30 (R/W)	°C bar	80	-40	**6** **8.7**
F09	Heat cycle maximum speed differential Heat cycle maximum speed pressure differential (1)	F	32 (R/W)	°C bar	50	0	**3** **0.9**
F10	Heat cycle fan OFF temperature differential Heat cycle fan OFF pressure differential (1)	F	34 (R/W)	°C bar	F08	0	**6** **1.9**
F11	Fan start-up time	F	51 (R/W)	sec.	120	0	**0**
F12	Triac impulse duration	F	52 (R/W)	sec.	10	0	**2**
F13	Fan management in defrost mode. 0= fan deactivated 1= fan activated in cool cycle mode (function not available) 2= fan deactivated until defrost end temperature is reached and start-up at maximum speed for d16	F	53 (R/W)		2	0	**2**
F14	Fan in operation when starting with high ambient temperature	U	91 (R/W)	sec.	999	0	**30**

(1) Parameters to be checked when pressure probes are to be used (low ambient kit accessory) YLHA PLUS 5 to 15.

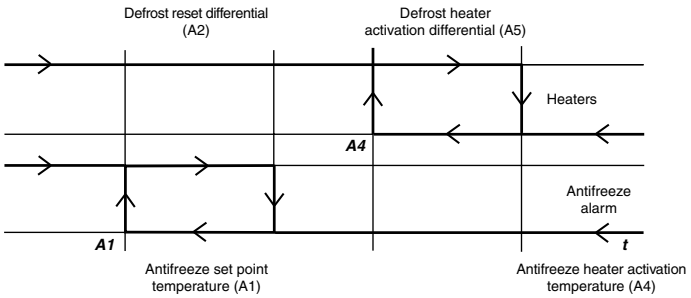




Parameters related to defrost							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
d01	Execution of defrost 0= no (function not available) 1= yes.	U	7 (R/W)	-	1	0	**1**
d02	Time or temperature defrost. 0= time (function not available). 1= temperature	U	8 (R/W)	-	1	0	**1**
d03	Defrost start temperature/pressure	U	19 (R/W)	°C bar	d04	-40/ 11	**-3** **6.2**
d04	Defrost end temperature/pressure	U	21 (R/W)	°C bar	80/ 12	d03	**20** **14.4**
d05	Minimum time for defrost start	U	37 (R/W)	sec.	150	10	**10**
d06	Minimum defrost duration	U	38 (R/W)	sec.	150	0	**0**
d07	Maximum defrost duration	U	39 (R/W)	Min.	15	1	**6**
d08	Time between two defrost cycles	U	40 (R/W)	Min.	150	10	**30**
d11	Activation of heaters in defrost 0= no. 1= yes.	U	9 (R/W)	-	0	1	**1**
d12	Compressor OFF before defrost	F	43 (R/W)	Min.	3	0	**1**
d13	Compressor OFF after defrost	F	44 (R/W)	Min.	3	0	**1**
d16	Time of forced vent after defrost (only if F13=2).	F	47 (R/W)	sec.	360	0	**60**



Parameters related to defrost control configuration							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
A01	Antifreeze control set point temperature	U	11 (R/W)	°C	-	A07	**3**
A02	Antifreeze reset differential	U	12 (R/W)	°K	50	0.3	**5**
A03	Antifreeze alarm bypass time	U	22 (R/W)	Sec.	150	0	**0**
A04	Antifreeze heater activation temperature	U	13 (R/W)	°C	r16	A01	**3**
A05	Antifreeze heater activation differential	U	14 (R/W)	°K	50	0.3	**2**
A06	Backup heater control probe 0= control probe 1= antifreeze probe	F	6 (R/W)	-	1	0	**0**
A07	Minimum level antifreeze control set point temperature	U	15 (R/W)	°C	79	-40	**3**
A08	Heating heater activation set point temperature	U	16 (R/W)	°C	r15	A01	**3**
A09	Heating heater deactivation set point temperature differential	U	17 (R/W)	°C	50	0.3	**3**
A10	Automatic start-up by antifreeze alarm (unit in standby) 0= function deactivated 1= Water pump + heater 2= W pump + heater + compressor (heat pumps only) 3= Heater	U	23 (R/W)		3	0	**2**

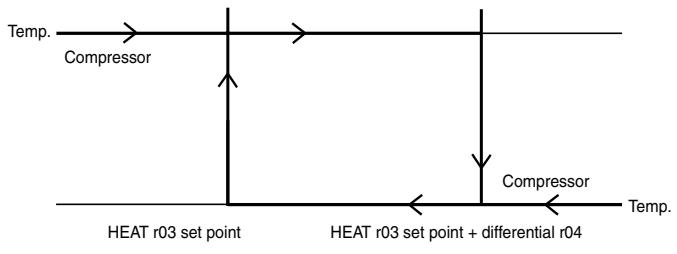


Parameters for unit configuration							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
H01	Unit model. 2= air-water chiller (LCA); 3= air-water heat pump.	F	54 (R/W)				**2 (YLCA)** **3 (YLHA)**
H02	Number of vent circuits (do not modify this parameter)	F	12 (R/W)				**0**
H03	No. of evaporating units present (do not modify this parameter)	F	13 (R/W)				**0**
H04	No. of compressors per circuit (do not modify this parameter)	F	55 (R/W)				**0**
H05	Pump operation 0= absent 1= Always ON 2= ON upon regulator call 3= On under regulator and time call	F	56 (R/W)		3	0	**1**
H06	COOL/HEAT digital intake 0= Absent. 1= Present	U	14 (R/W)		1	0	**0**
H07	ON/OFF digital intake 0= Absent. 1= Present	U	15 (R/W)		1	0	**0**
H08	Network configuration (do not modify this parameter)	F	57 (R/W)		3	0	**0**
H09	Keyboard locked 0= Disabled. 1= Abled	U	16 (R/W)		1	0	**1**
H10	Serial direction for supervision 0= Future use as terminal	U	58 (R/W)		200	1	**1**
H11	Output configuration (not selectable)	F	59 (R/W)		3	0	**0**
H12	4-way valve logic operation. Activated in cold cycle (do not modify this parameter)	F	60 (R/W)		3	0	**0**
H21	Second pump operation (do not modify this parameter)	F	62 (R/W)		4	0	**0**
H22	Default loading of parameters disabled 1= Disabled. 0= Abled	F	18 (R/W)		1	0	**0**
H23	Modbus protocol setting 0= Disabled. 1= Abled	F	11		1	0	**0**

Parameters for alarm configuration							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
P01	Alarm delay by flow switch at start-up.	U	63 (R/W)	Sec.	150	0	**20**
P02	Alarm delay by flow switch with unit in operation.	U	64 (R/W)	Sec.	120	0	**5**
P03	Alarm delay by low pressure switch at start-up.	U	65 (R/W)	Sec.	200	0	**60**
P05	Alarm reset 6= Low and high pressure switch manual reset at third activation in one hour. Antifreeze control is manual reset.	F	67 (R/W)				**6**
P06	Cool and heat cycle symbol. 1= “Sun” heat cycle, “Snow flake” cool cycle. 0= “Sun” cool cycle, “Snow flake” heat cycle.	F	19 (R/W)		1	0	**1**
P08	Digital intake 1 for flow switch. Do not modify this parameter.	F	69 (R/W)				**1**
P09	Digital intake 2 for remote Cool/Heat function. Do not modify this parameter.	F	70 (R/W)				**9**
P15	Low pressure alarm selection. 0= Inoperative with compressor OFF. 1= Operative with compressor OFF.	F	76 (R/W)		1	0	**1**
P16	High temperature alarm of return water.	U	38 (R/W)	°C	80	-40	**30**
P17	High temperature delay at start-up.	U	77 (R/W)	Sec.	250	0	**30**
P18	High pressure alarm by transducer 0= Function disabled.	F	39 (R/W)	bar	99.9	0.1	**41**
P19	Low temperature alarm of return water.	U	40 (R/W)	°C	80	-40	**10**
P20	Alarm activation by high or low water temperature at start-up. 1= Function abled. 0= Function disabled.	U	20 (R/W)		1	0	**0**

Parameters for regulator configuration							
Display	**Description**	**Level**	**VS**	**Unit**	**Max**	**Min**	**Value**
r01	Cool cycle set point temperature	U	41 (R/W)	°C	r14	r13	**12**
r02	Cool set point temperature differential	U	42 (R/W)	°C	50	0.3	**1**
r03	Heat cycle set point temperature	U	43 (R/W)	°C	r16	r15	**40**
r04	Heat cycle set point temperature differential	U	44 (R/W)	°C	50	0.3	**2**
r06	Type of adjustment 0= Proportional. Intake temperature. 1= Proportional + neutral zone. Intake temp. 2= Proportional. Output temperature. 3= Proportional + neutral zone. Output temp. 4= By time + dead zone. Output temperature (chillers only).	F	79 (R/W)		4	0	**0**
r07	Neutral zone differential	F	45 (R/W)	°C	50	0	**1**
r08	(If r06=4 only) Maximum activation time. Output temperature.	F	80 (R/W)	Sec.	999	r09	**120**
r09	(If r06=4 only) Minimum activation time. Output temperature.	F	81 (R/W)	Sec.	999	c04	**100**
r10	(If r06=4 only) Maximum deactivation time. Output temperature.	F	82 (R/W)	Sec.	999	r11	**120**
r11	(If r06=4 only) Maximum deactivation time. Output temperature.	F	83 (R/W)	Sec.	999	c05	**100**
r12	(If r06=4 only) Compressor deactivation differential.	F	46 (R/W)	°C	50	0	**1**
r13	Cool cycle minimum set point temperature.	U	47 (R/W)	°C	r14	-40	**6**
r14	Cool cycle maximum set point temperature.	U	48 (R/W)	°C	80	r13	**20**
r15	Heat cycle minimum set point temperature.	U	49 (R/W)	°C	r16	-40	**25**
r16	Heat cycle maximum set point temperature.	U	50 (R/W)	°C	80	r15	**45**
r17	Summer compensation constant	U	51 (R/W)	-	+5	-5	**-0.4**
r18	Maximum set point distance	U	52 (R/W)	°K	20	0.3	**3.2**
r19	Summer compensation start-up temperature	U	53 (R/W)	°C	176	-40	**32**
r20	Winter compensation start-up temperature	U	54 (R/W)	°C	176	-40	**5**
r27	Suppression of buffer tank. 0= No suppression. 1= Suppression in cool cycle. 2= Suppression in heat cycle. 3= Permanent suppression.	F	88 (R/W)		3	0	**0 (a)**
r28	Minimum time for determining low charge	F	89 (R/W)	Sec.	999	0	**210**
r29	Low charge differential in cool cycle	F	58 (R/W)	°C	50	0.3	**3**
r30	Low charge differential in heat cycle	F	58 (R/W)	°C	50	0.3	**4**
r31	Winter compensation constant	U	60(R/W)	-	+5	-5	**-0.4**

(a) Do not enable this function on SOFT START units.



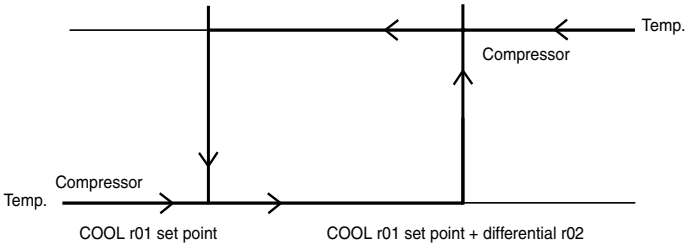


Table of alarms		
Display	**Alarm type**	**Reset**
A1	Antifreeze alarm	Manual
AHt	High temp. at start-up (if activated, P20=1)	Automatic
ALt	Low temp. at start-up (if activated, P20=1)	Automatic
d1-2	Defrost in operation	-
dF1-2	Problem in defrost	Automatic
E1	Probe B1	Automatic
E2	Probe B2	Automatic
E3	Probe B3	Automatic
E4	Probe B4	Automatic
ELS	Low supply voltage	Automatic
EHS	High supply voltage	Automatic
EPr	Eprom error. Unit in operation.	Automatic
EPb	Eprom error. At start-up	Automatic
ESP	Communication failure with expansion module	Automatic
EL	Problem at fan voltage control	Automatic
FL	Flow switch	Manual
Hc	Compressor maintenance alarm	Automatic
HP	High pressure/Thermal fan protector	Manual
Ht	High water temperature alarm	Automatic
L	Low charge alarm	Automatic
LP	Low pressure	Manual

Reset of alarms
Pressing the UP and DOWN keys for 5 seconds cancels alarms present in the memory. At the same time, the alarm message disappears from the display and the alarm relay is deactivated.

Forced defrost (heat pumps)
Pressing the SEL and UP keys simultaneously for 5 seconds activates forced defrost of the unit.

Clearing hour counters
While reading compressor or pump (c10 and c15) operating hours, said counters can be cleared by pressing the UP and DOWN keys simultaneously.

Pump operation
4 operating modes can be selected in accordance with the value given to parameter H5. H5=0 (pump disabled), H5=1 (pump permanently on), H5=2 (pump ON controlled by the regulator or in parallel with the compressor), H5=3 (pump goes on and off at regular intervals, independent of compressor operation) (parameters c17 and c18).

Calibration of probes
If necessary, probes can be calibrated by using parameters /13, /14, /15, and /16. See Parameters related to probes table.

Remote ON/OFF
A remote ON/OFF intake can be connected between terminals D5 and B on the connecting strip. To activate said intake, a value of 1 should be given to parameter H07 (H07= 1). With this intake open the unit is OFF; when closed, the unit is ON. This option does not disable the ON/OFF function of the keyboard.

Remote COOL/HEAT
A remote COOL/HEAT intake can be connected between terminals D2 and B on the connecting strip. To activate said intake, a value of 1 should be given to parameter H06 (H06= 1). With this intake open the unit is in HEAT; when closed, the unit is in COOL. This function disables the COOL/HEAT function of the keyboard.

Temperature/heater characteristics of the NTC control probes (10 kOhms)

Temperature (°C)	Heater (kOhms)
-50	329.20
-49	310.70
-48	293.30
-47	277.00
-46	261.80
-45	247.50
-44	234.10
-43	221.80
-42	209.80
-41	198.70
-40	188.40
-39	178.30
-38	168.90
-37	160.10
-36	151.80
-35	144.00
-34	136.60
-33	129.70
-32	123.20
-31	117.10
-30	111.30
-29	106.70
-28	100.40
-27	95.47
-26	90.80
-25	86.39
-24	82.22
-23	78.29
-22	74.58
-21	71.07
-20	67.74
-19	64.54
-18	61.62
-17	58.66

Temperature (°C)	Heater (kOhms)
-16	55.95
-15	53.99
-14	50.90
-13	48.66
-12	46.48
-11	44.41
-10	42.45
-9	40.56
-8	38.76
-7	37.05
-6	35.48
-5	33.89
-4	32.43
-3	31.04
-2	29.72
-1	28.47
0	27.28
1	26.13
2	25.03
3	23.09
4	22.09
5	22.05
6	21.15
7	20.20
8	19.48
9	18.70
10	17.98
11	17.24
12	16.55
13	15.90
14	15.28
15	14.68
16	14.12
17	13.57
18	13.08
19	12.58
20	12.09
21	11.83
22	11.20
23	10.78
24	10.38
25	10.00

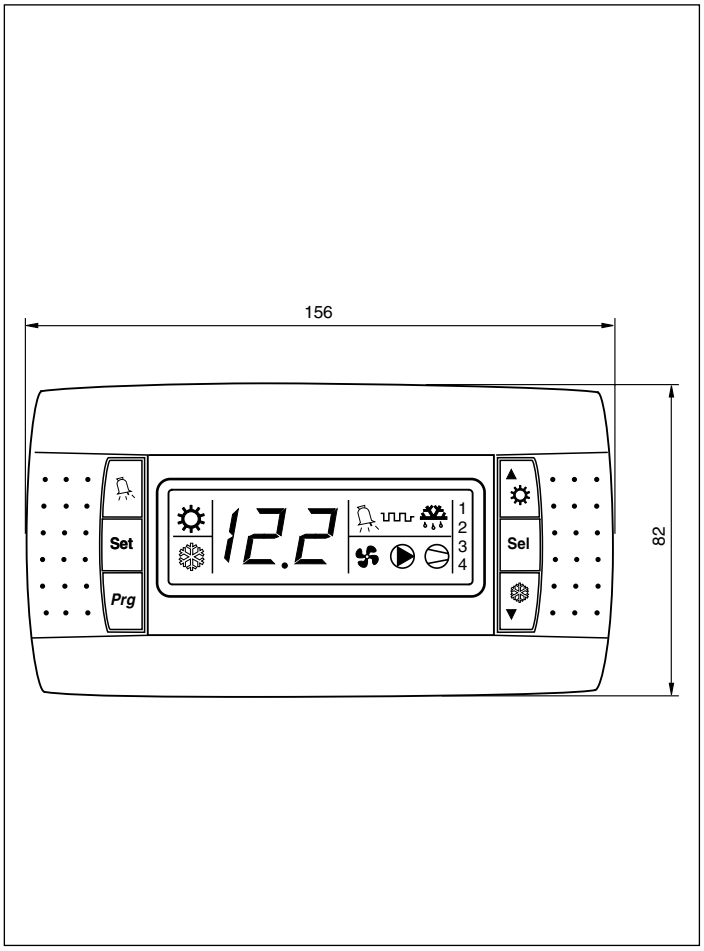
Temperature (°C)	Heater (kOhms)
26	9.63
27	9.28
28	8.94
29	8.82
30	8.31
31	6.01
32	7.72
33	7.45
34	7.19
35	6.94
36	6.69
37	6.46
38	6.24
39	6.03
40	5.82
41	5.63
42	5.43
43	5.24
44	5.08
45	4.91
46	4.74
47	4.59
48	4.44
49	4.30
50	4.16
51	4.02
52	3.80
53	3.77
54	3.65
55	3.53
56	3.42
57	3.31
58	3.21
59	3.11
60	3.02
61	2.92
62	2.83
63	2.75
64	2.66
65	2.58
66	2.51
67	2.43

Temperature (°C)	Heater (kOhms)
68	2.36
69	2.29
70	2.22
71	2.16
72	2.10
73	2.04
74	1.98
75	1.92
76	1.87
77	1.81
78	1.76
79	1.71
80	1.66
81	1.62
82	1.57
83	1.53
84	1.49
85	1.45
86	1.41
87	1.37
88	1.33
89	1.30
90	1.26
91	1.23
92	1.20
93	1.16
94	1.13
95	1.10
96	1.06
97	1.05
98	1.02
99	0.99
100	0.97
101	0.94
102	0.92
103	0.90
104	0.87
105	0.85
106	0.83
107	0.81
108	0.79
109	0.77

Accessories

Remote terminal

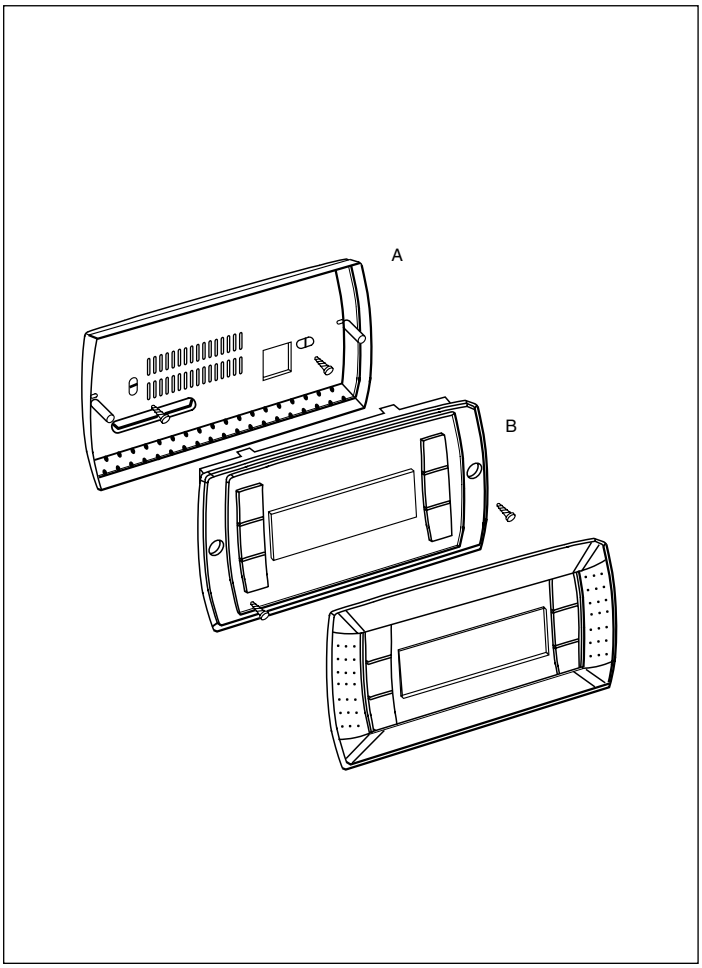
This accessory allows remote control and supervision of the air conditioning unit (up to 1040 m.). Functions are the same as the standard control panel keyboard. This remote terminal is compatible with said keyboard, and the air conditioning unit can be accessed from both devices. For this application, it must be connected to the system by means of the *RS485 serial line connection accessory.*



Wall-mounting

For wall-mounting, the rear support (A) must be fastened to a standard three-switch modular box.

- Fasten the rear of the casing to the box by means of the two round head screws.
- Connect the telephone cable.
- Lean the control unit on the rear casing and fasten by means of the two flat head screws (B).
- Fasten the front panel by applying slight pressure.



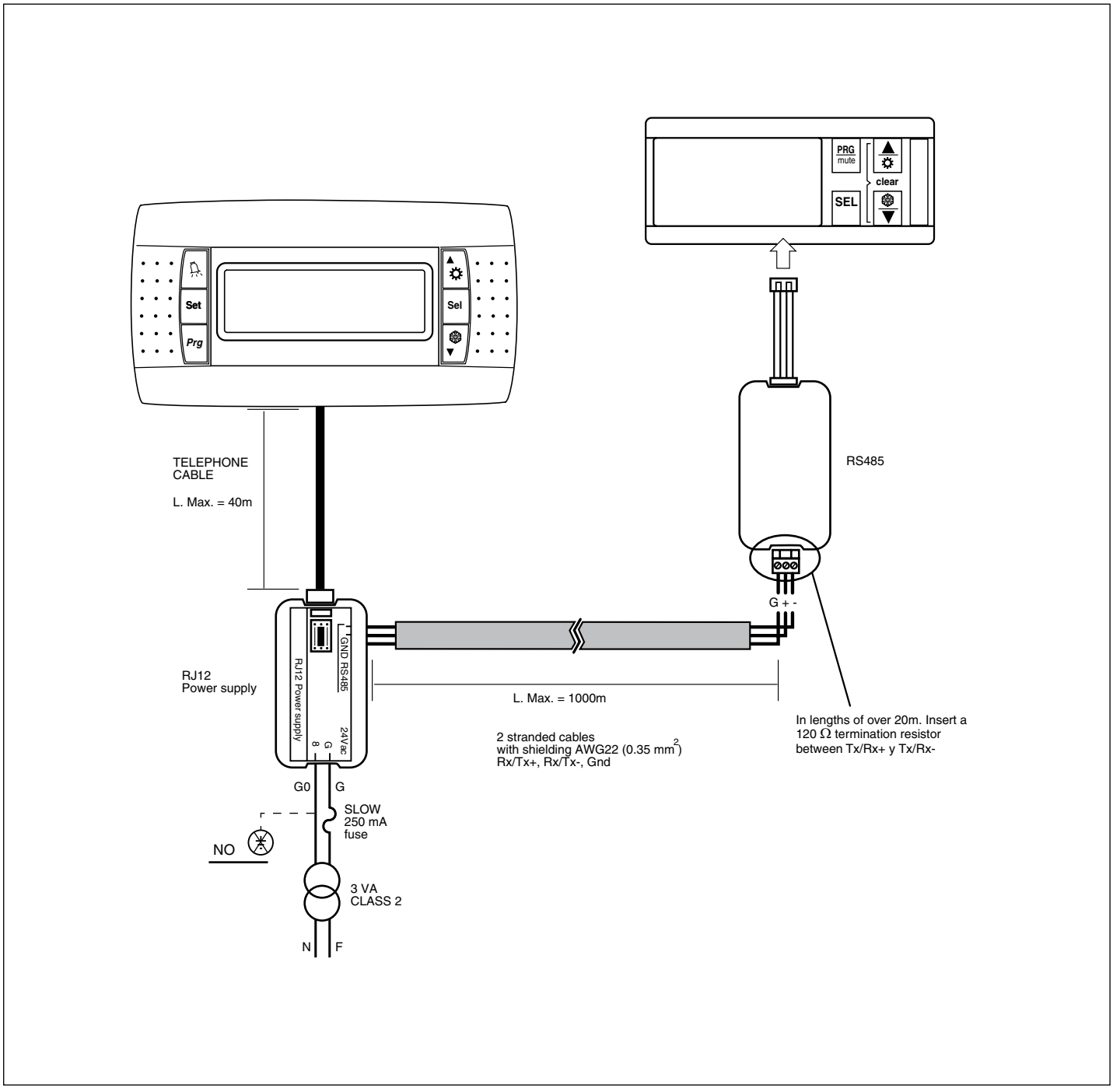
Wiring

Connect the RS485 serial device (separate accessory) to the RJ12 *power supply* outlet (included with the remote terminal) and to the electric panel keyboard supervising connection, using shielded cable. Power terminals G-G0 by means of a transformer and a 250mAT fuse as per the diagram enclosed. Carry out connection between *power supply* RJ12 and the remote terminal, using the telephone cable supplied (80 cms.). This cable can be replaced by a longer cable of up to a maximum of 40 m.

Attention:

- Use safety transformers only (3VA, class 2).
- For safety purposes, a 250mA slow fuse should be inserted in series with the G terminal.
- Do not ground transformer secondary.

Maximum distance to RS485	*1 km. (insert a 120-ohm 1/4W resistor in RS485)*
Speed	*19.200 bauds*
Cable characteristics	*2 braided cables with shielding*
Cable section	*AWG22 (0.35 mm²)*
Capacity per metre	*>90pF/m (for example, BELDEN 8761-8762 cable)*



Installation

No configuration is necessary for the remote terminal to be operative because the terminal operates whatever the control serial direction might be (can be selected by means of parameter H10). At start-up, the screen will display the control version. After 4 seconds, all symbols will be displayed. Should the connection to the RS485 not be correct, or the control unit is set to *off*, the message *ofe-line* is displayed.

Info mode

Pressing the up, down and sel keys simultaneously for over 6 seconds, four lines are displayed with information on the system and communications.

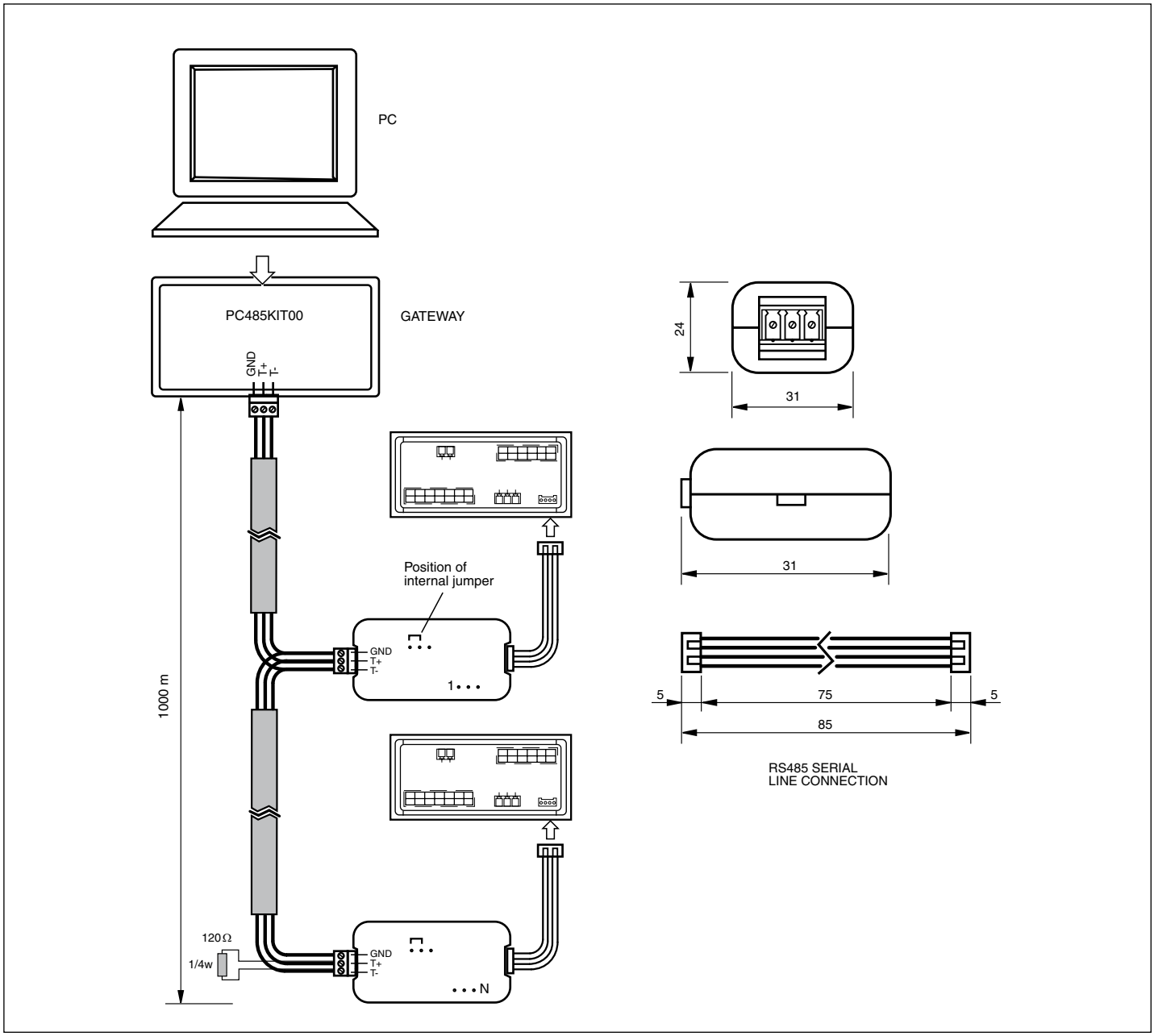
Line 1	*Terminal version*
Line 2	*Control unit version*
Line 3	*Control supervision direction*
Line 4	*Error percentage between the terminal and the control unit*

Connecting serial line RS485

This accessory allows connecting the air conditioning unit to a serial line RS485 supervision network. It must also be used to install the remote terminal accessory.

Mounting

Connect the accessory to the four-pole socket base at the lower right angle of the module with display and keyboard. Use the 4-cable connector supplied. Connect to the supervising system as indicated in the diagram below.
The series should be terminated by connecting a 120-ohm 1/4W resistor between terminals TxRx+ and TtxRx-.



Attention:

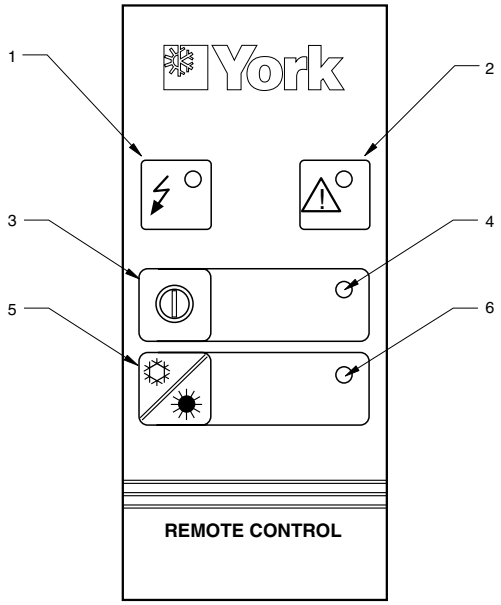
- *Secure the device inside the electric panel so as to avoid accidental disconnection.*
- *Interconnect after having turned power supply off first.*
- *Keep the serial connection cables away from the power supply cables.*

Maximum distance supervision	*1000 m. (insert a 120-ohm 1/4W resistor in the last RS485 connection)*
Speed	*19.200 bauds*
Cable characteristics	*2 braided cables with shielding*
Cable section	*AWG22 (0.35 mm²)*

Remote control unit

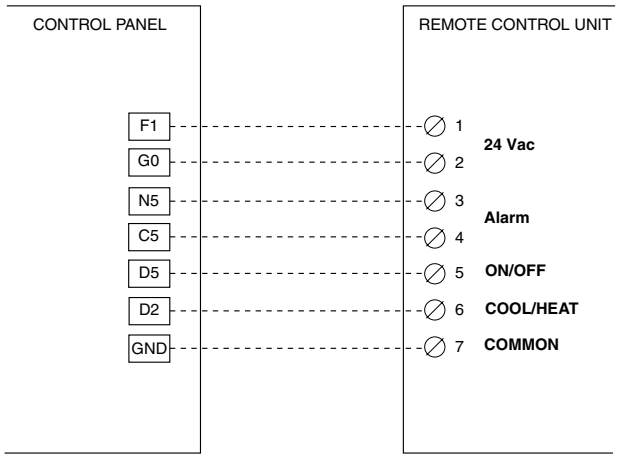
Wall-mounted, with keys for COOL/HEAT and ON/OFF functions. Includes power supply, alarm and COOL/HEAT LEDs. Prior to installation value 1 must be given to parameters H06 and H07.

1- Power supply LED
2- Alarm LED
3- ON/OFF key
4- Unit ON LED
5- COOL/HEAT key
6- LED ON in COOL/
LED OFF in COOL



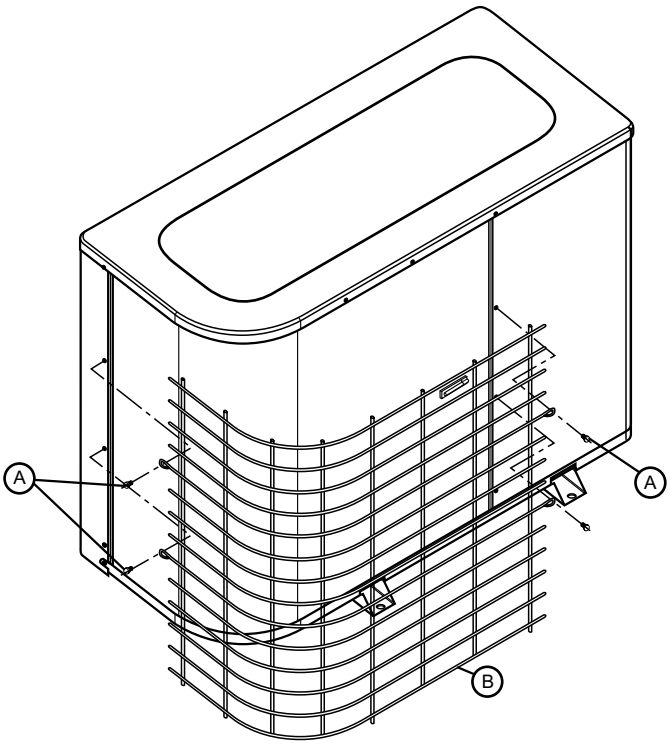
- The remote control unit can be located at a maximum distance of 50 m.
- Minimum cable section should be 0.35 mm².
- Keep the control cables away from the power supply cables.

Connection to control panel



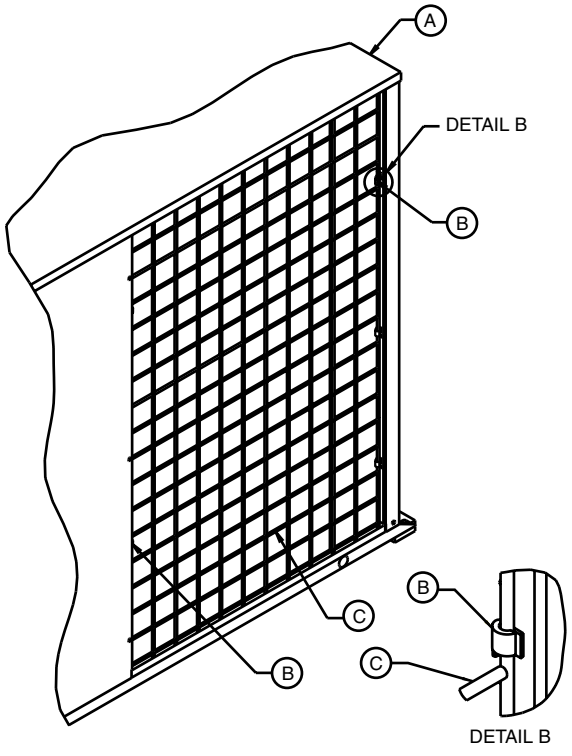
Protection grids

YLCA/YLHA/YLHA PLUS 5 - 15



1- Remove the 4 screws A.
2- Fasten grid B with the 4 screws A.

YLCA/YLHA/YLHA PLUS 20 - 27



1- Remove upper cover A.
2- Fasten grid C with the 6 plastic hooks B.
3- Replace upper cover A.

Buffer tank
YLCA/YLHA/YLHA PLUS 5, 7, 9, 12 and 15

For installations with low water volume that need to increase thermal inertia.
This application achieves greater precision of the water temperature in the installation and a decrease of on/off cycles of the compressor.

Casing

Made up of removable panels fastened by screws that allow access to the internal components. These panels are made of aluminium-coated steel sheeting painted electrostatically with powered epoxy-polyester enamel, in a 60-micron coat, that assures efficient protection along the entire surface.

Tank

Made of steel sheeting galvanized by immersion. It has a 10 mm. coating of closed-cell, cross-linked expanded polyethylene plus a film of embossed aluminium. There is an air purger at the top, and two connections for draining and refilling the circuit in the middle and the bottom. The tank allows a maximum pressure of 6 bar.

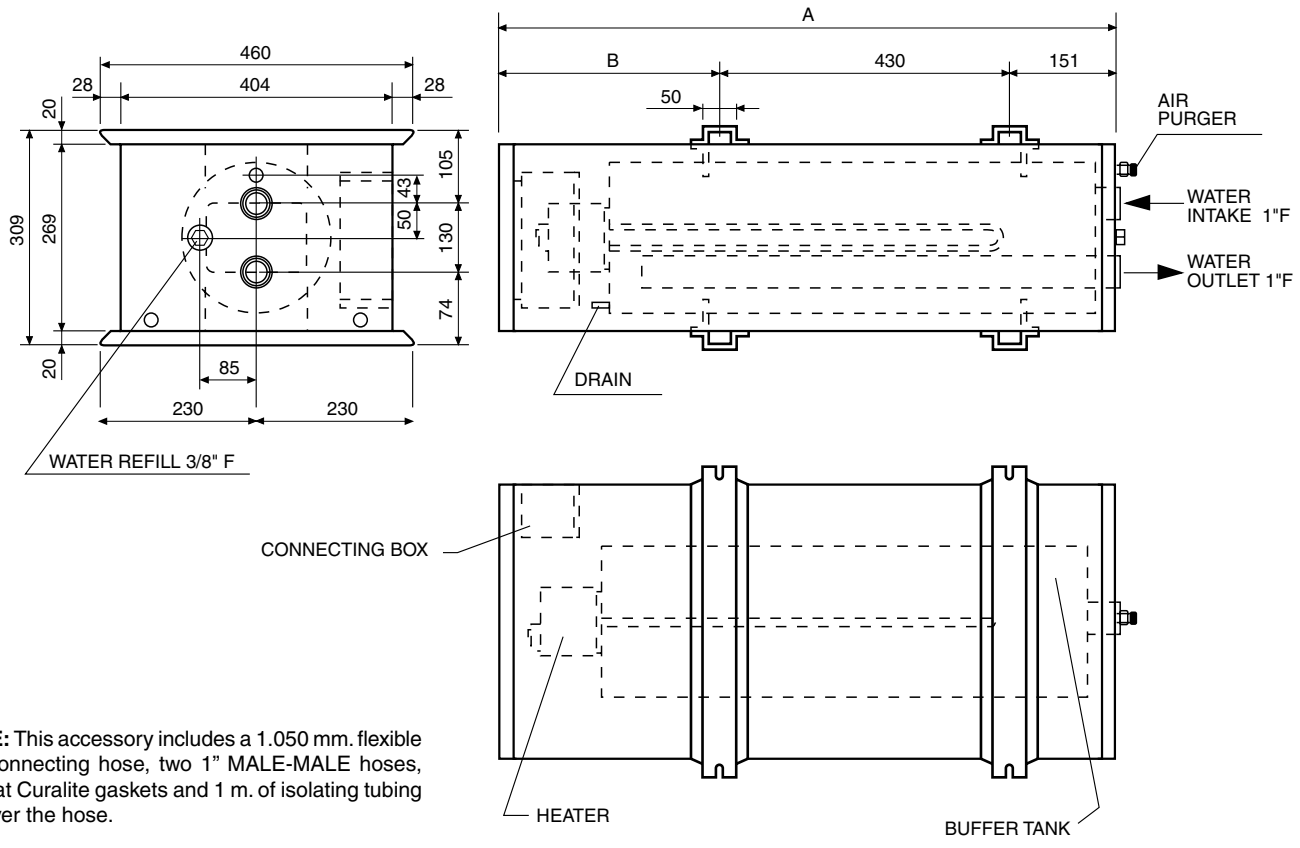
Location

Can be set up in either horizontal or vertical position independent of the chiller. It can be set directly on the floor and located both indoors as well as outdoors.

Backup heater (YLHA)

Two tanks are available with a backup heater, see variant chart, that can be controlled by the main controller of the heat pump.
These assemblies are equipped with an electric connecting box at the top.

Dimensions



NOTE: This accessory includes a 1.050 mm. flexible interconnecting hose, two 1" MALE-MALE hoses, two flat Curalite gaskets and 1 m. of isolating tubing to cover the hose.

Buffer tank	A	B
20 litres	907	326
30 litres	1007	426

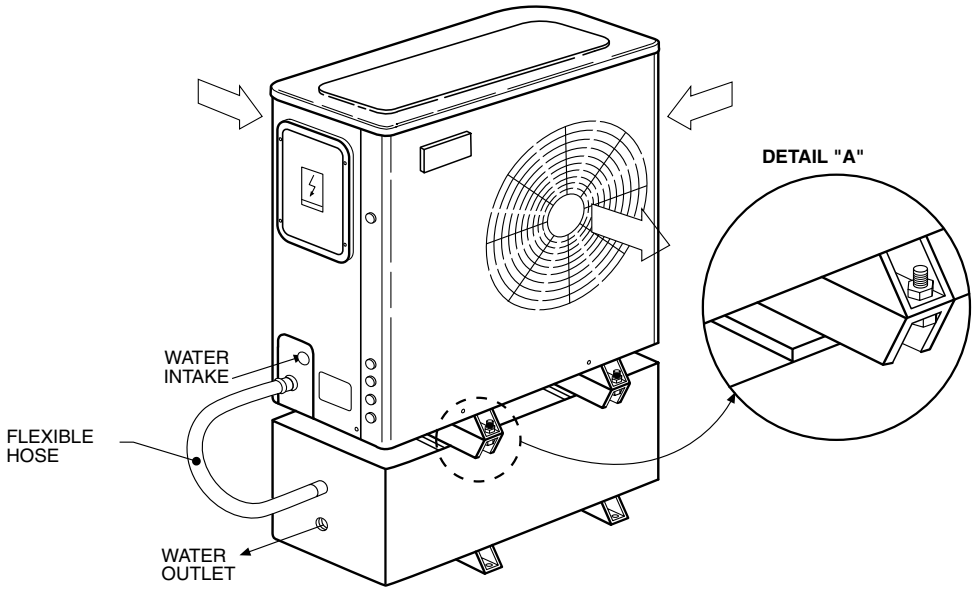
Pressure drops of 20 and 30 buffer tanks (kPa)
(Including interconnecting flexible hose)

Flow l/h														
1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500
0	0.5	1.2	2.2	3.4	4.8	6.1	7.6	9	10.8	12.8	14.9	17.1	19.3	21.6

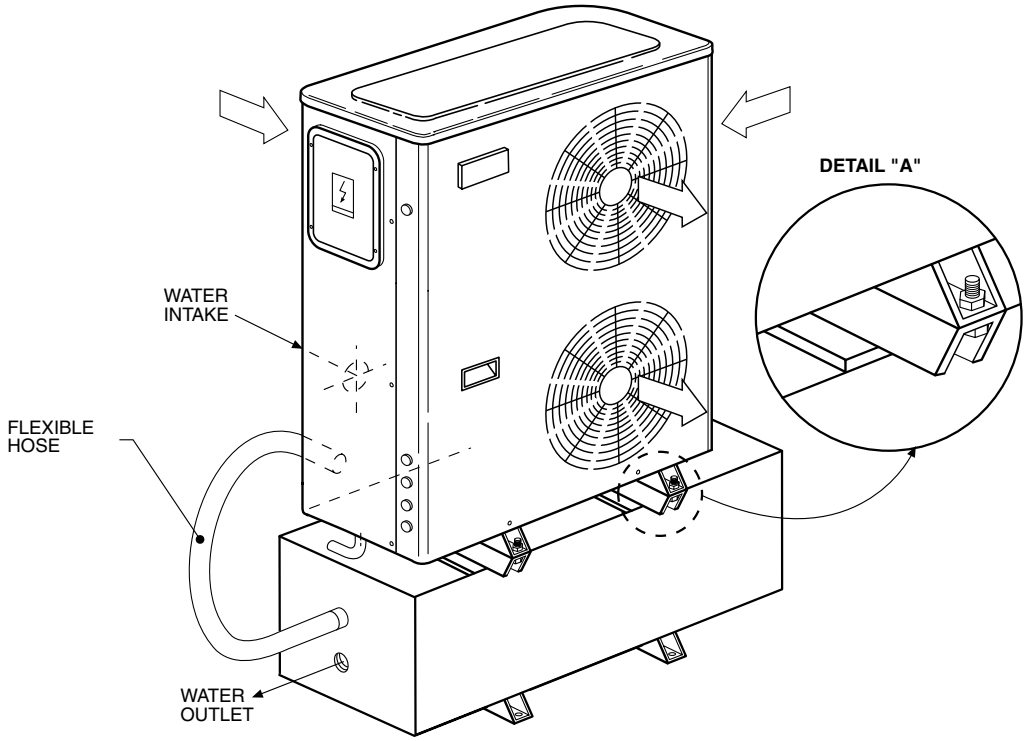
Variants

Units	Buffer tank	Heater
5, 7, 9	20 litres	-
9, 12, 15	30 litres	-
5, 7	20 litres	2 kW/230M
5, 7	20 litres	3 kW/230M
7, 9	20 litres	3 kW/400T
9,12	30 litres	4.5 kW/400T
12,15	30 litres	6 kW/400T

Assembly on units 5, 7 and 9



Assembly on units 12 and 15



1.- Fasten the buffer tank to the unit (Detail A) by means of the screws supplied with the accessory.
2. Hydraulically interconnect the buffer tank to the unit by means of the flexible hose, the two other hoses and the two Curalite gaskets supplied with the accessory. Cover the hose with isolation tubing.

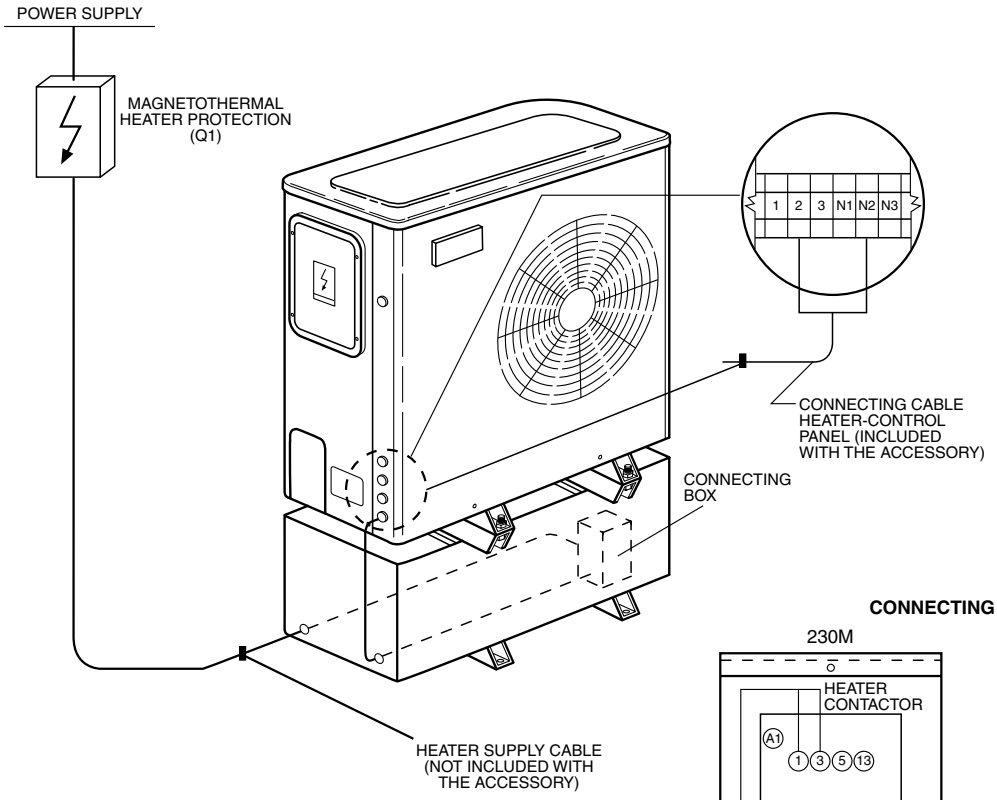
Attention:

Before starting the system, purge the air from the tank and the hydraulic circuit.

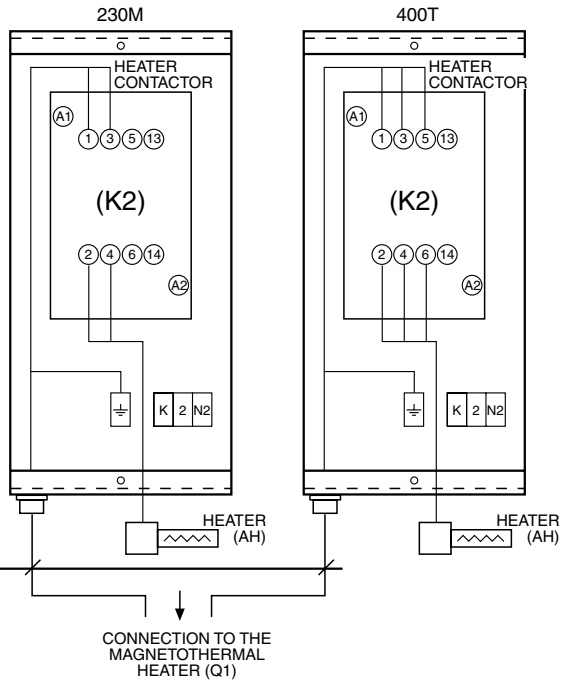
If an electric heater is installed, do not power the unit until the circuit if full of water.

The heater includes a manual restart thermostat set to 95° C.

WIRING OF THE HEATER
(See wiring diagram of the unit)



CONNECTING BOX



HEATER	CABLE mm² Cu	Q1 (A)
2 kW/230M	2.5	15
3 kW/230M	2.5	15
3 kW/400T	1.5	6
4.5 kW/400T	1.5	8
6 kW/400T	2.5	15

115-litre buffer tank YLCA/YLHA/YLHA PLUS 20 and 37

For installations with low water volume that need to increase thermal inertia.
This application achieves greater precision of the water temperature in the installation and a decrease of on/off cycles of the compressor.

Casing

Made up of removable panels fastened by screws that allow access to the internal components. These panels are made of aluminium-coated steel sheeting painted electrostatically with powered epoxy-polyester enamel, in a 60-micron coat, that assures efficient protection along the entire surface.

Tank

Made of steel sheeting galvanized by immersion. It has a 10 mm. coating of closed-cell, cross-linked expanded polyethylene plus a film of embossed aluminium. There is an automatic air purger at the top, and two manual valves for draining and refilling the circuit at the bottom. The tank allows a maximum pressure of 6 bar.

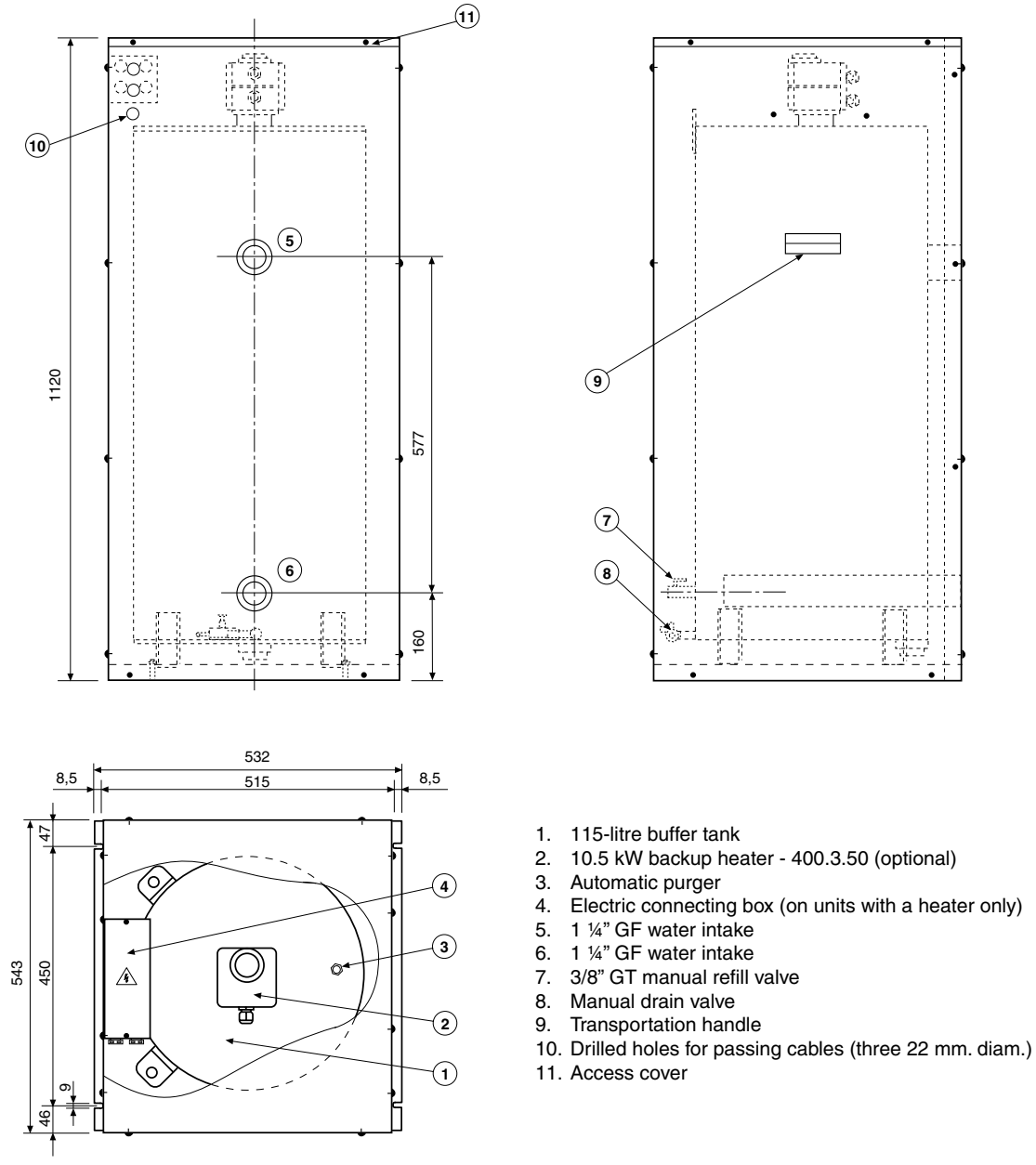
Location

Should always be set in vertical position. It can be set directly on the floor and located both indoors as well as outdoors.

Backup heater (YLHA/YLHA PLUS)

Two tanks are available tanks equipped with a 10.5 kW (400.3.50) backup heater that can be controlled by the main controller of the heat pump.
These assemblies are equipped with an electric connecting box inside.

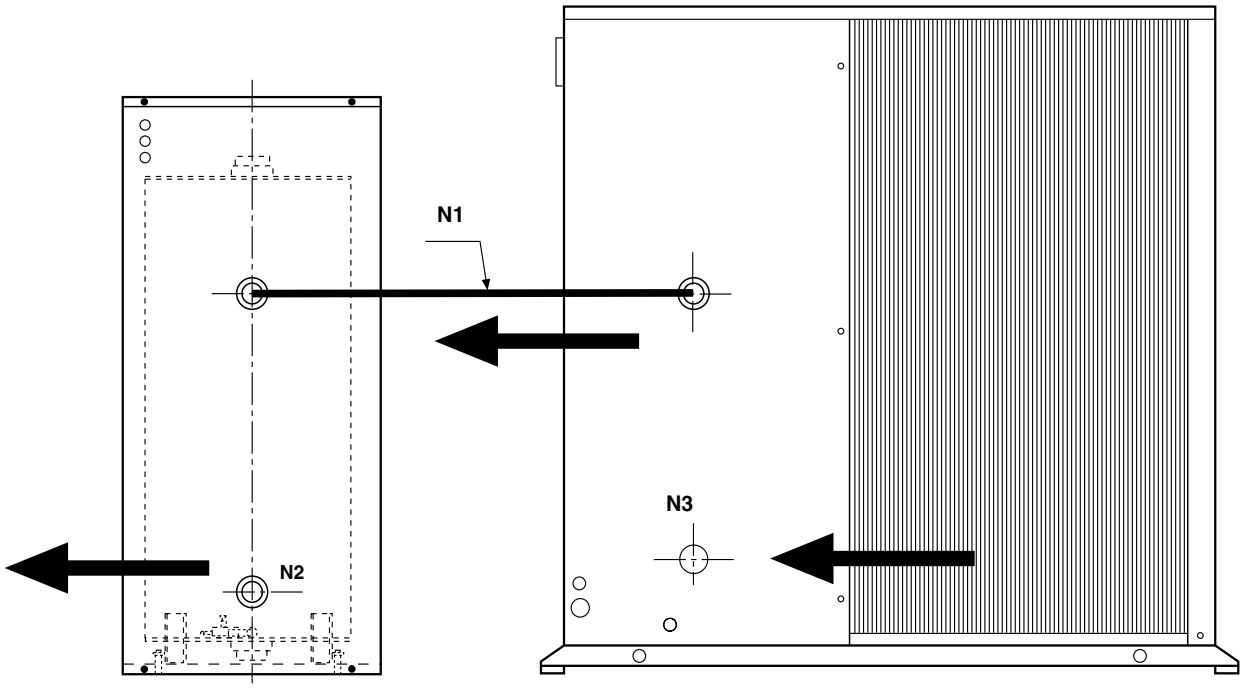
General dimensions mm.



1. 115-litre buffer tank
2. 10.5 kW backup heater - 400.3.50 (optional)
3. Automatic purger
4. Electric connecting box (on units with a heater only)
5. 1 ¼" GF water intake
6. 1 ¼" GF water intake
7. 3/8" GT manual refill valve
8. Manual drain valve
9. Transportation handle
10. Drilled holes for passing cables (three 22 mm. diam.)
11. Access cover

Hydraulic connections

YLCA/YLHA/YLHA PLUS 20 and 27



N1. Interconnecting tubing (should be insulated to avoid concentration).
N2. Water outlet.
N3. Water intake

Electric interconnection of the heater

- Prior to proceeding with the installation, disconnect the power supply from the YLHA/YLHA PLUS units.
- Do not power again until the installation is finished and with the tank full of water.

AH - 10.5 kW backup heater (400.3.50)

BT - Buffer tank

EBBT - Buffer tank connecting box

EBHP - YLHA/YLHA PLUS connecting box

K2 - Heater contactor

Q1 - Heater magnetothermal protector

Installation

N1 - Remove the top cover from the tank.

N2 - Remove the cover from the connecting box

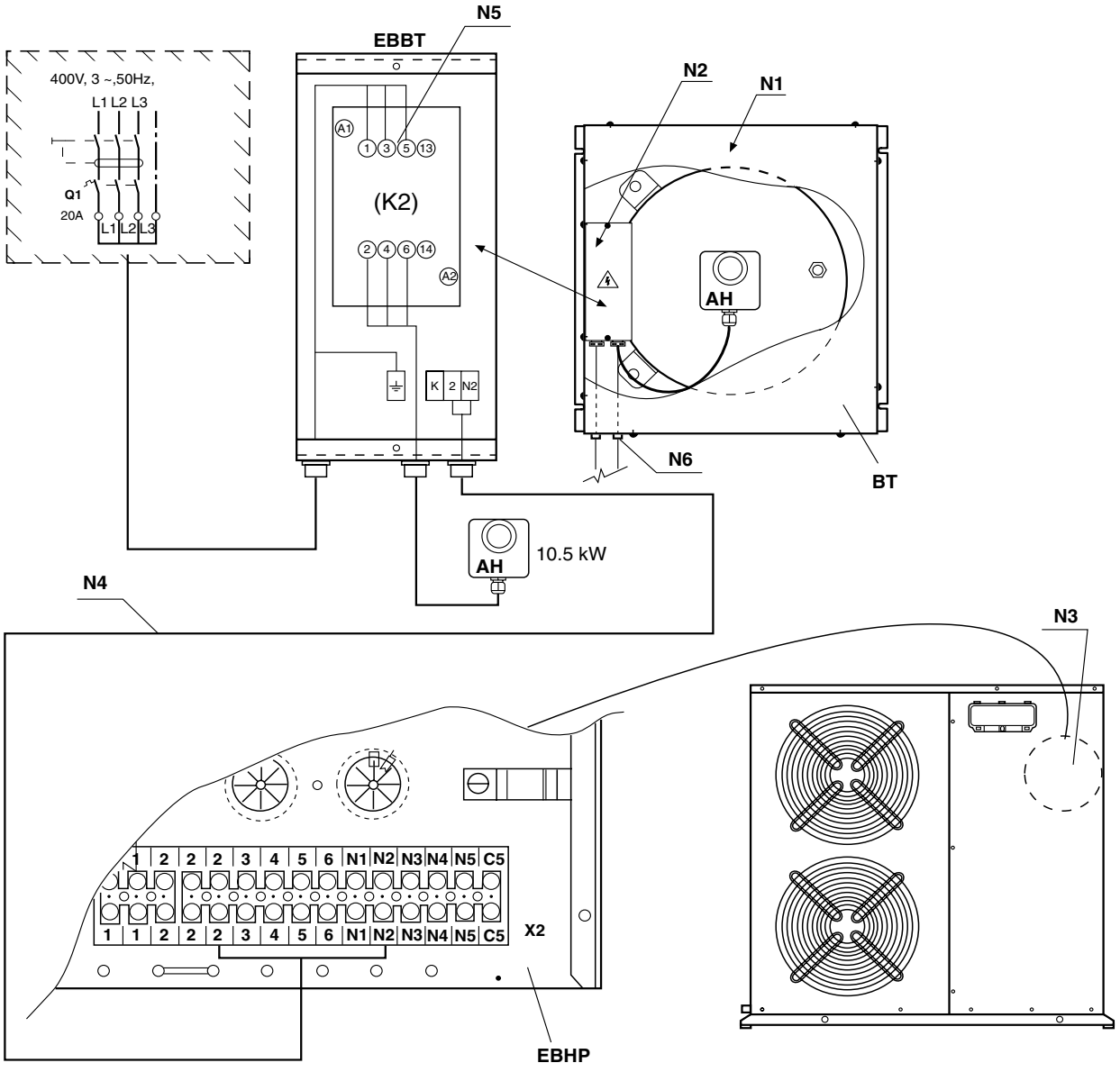
M3 - Remove the control box cover of the YLHA/YLHA PLUS unit.

N4 - Interconnect terminals 2 and N2 of the tank connecting box with the corresponding terminals of the YLHA/YLHA PLUS electric box.

N5 - Connect terminals 1, 3 and 5 of contactor K2, an the ground terminal of the tank electric box to the power supply. For this purpose, us the 2.5 mm² Cu cable and the a 20 Amp magnetothermal switch.

N6 - Pass the cables through the tank by means of the corresponding gland.

Electric interconnection of the heater



High pressure fan YLCA/YLHA 5 - 40, YLHA PLUS 5 - 27

Units 5, 7 and 9

This accessory includes:
- 1 fan
- 1 duct nozzle to be installed in the front panel
- 1 condenser to be installed in the control box.
- 1 4A magneto thermal switch.

Units 12, 15, 20 and 27

This accessory includes:
- 2 fans
- 2 duct nozzles to be installed in the front panel
- 2 condensers to be installed in the control box.
- 1 6A magneto thermal switch.

Units 40

This accessory includes:
- 2 fans (with the condenser installed in the terminal box).
- 1 10A magneto thermal switch.
- 1 8A speed selector.

The impulse air ducts can be installed directly in the nozzles of the fans.

Assembly

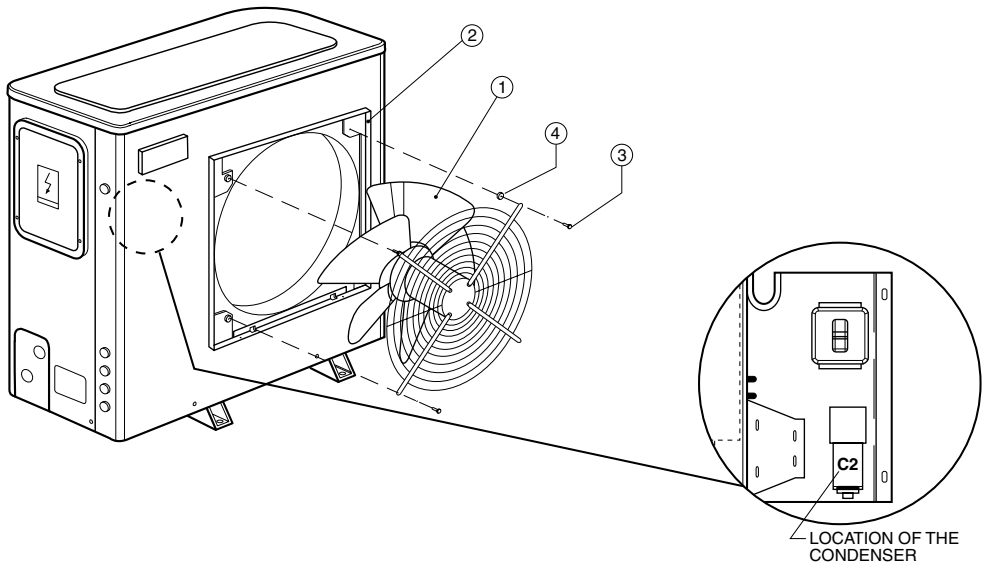
1. Disconnect the electric cables of the standard fan with two points of connection in the control box.
2. Replace the standard fan condenser with the one included with the accessory (except model 40).
3. Remove the standard fan from its housing. Reserve the screws and rubber supports.
4. Install the high pressure fan (1), inserting the duct nozzle (2) between the support panel and the fan grid. Use the same rubber supports (4) and screws (3). See diagram included. Model 40 does not include rubber supports.
5. Connect the electric cables of the high pressure fan to the same points where the standard fan was connected.
6. Substitute magneto thermal switch Q3.
   Substitute the speed selector (YLHA/YLCA 40 only).
7. Check operation and correct the cantering of the tubing, if necessary.

Characteristics of the high pressure fans

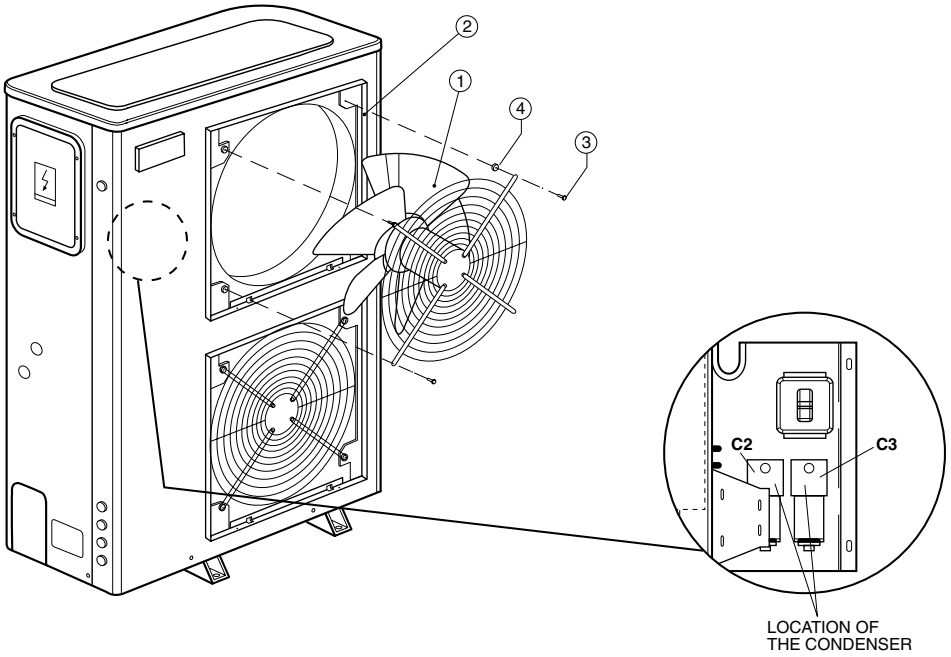
UNITS	AVAILABLE PRESSURE (with nominal flow)	RPM	Lw (dB) MAX. SPEED	DUCT DIMENSIONS (mm)	NUMBER OF FANS
5	60	1 390	78	502 x 502	1
7 and 9	45	1 390	78	502 x 502	1
12 and 15	45	1 390	81	502 x 1 104	2
20	45	1 390	81	502 x 1 104	2
27	40	870	79	610 x 1 215	2
40	130	1 370	84	2 x Diam. 600	2

Assembly detail

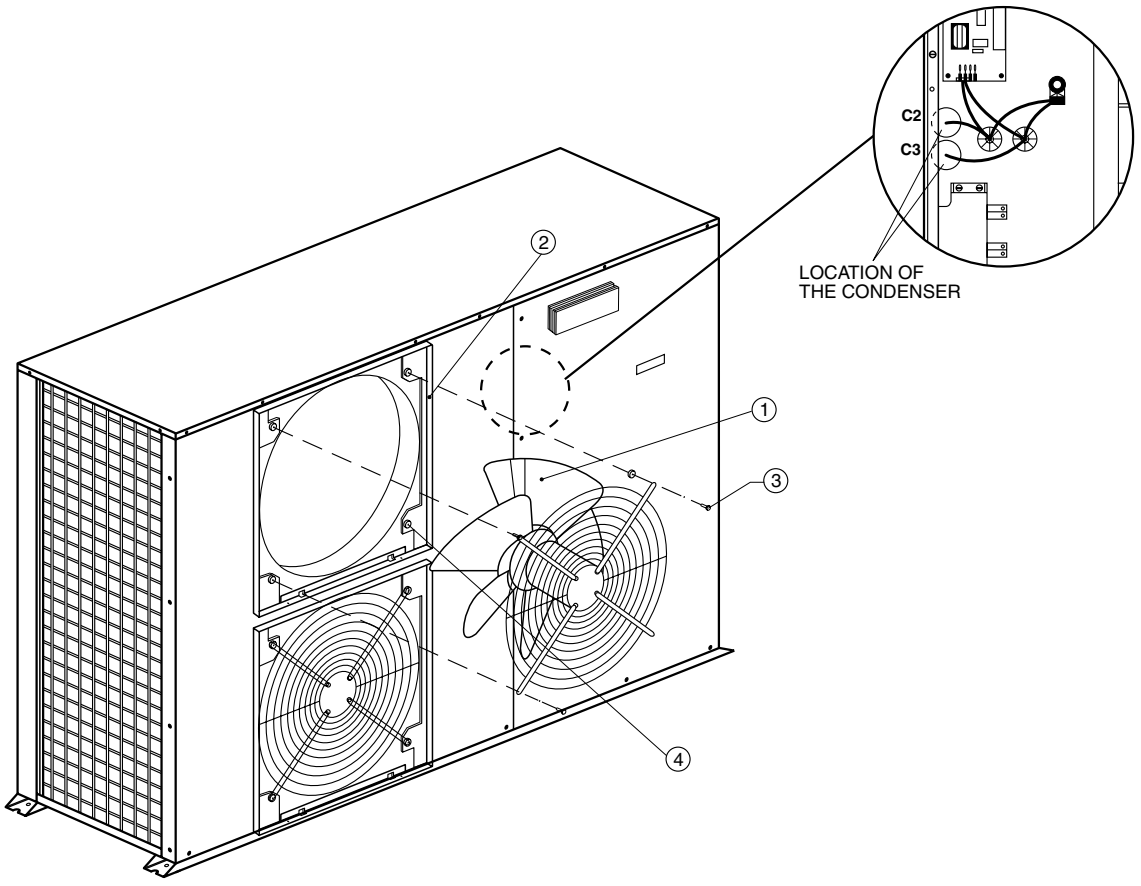
Units 5, 7 and 9



Units 12 and 15



Units 20 and 27



Low ambient temperature kit (ratiometric pressure transducer) YLCA/YLHA 5 to 40, YLHA PLUS 5 to 27

To adjust condensing pressure at low ambient temperatures (down to -18° C).
Models 20, 27 and 40 units include this probe as standard equipment.

The kit is comprised of:
1 ratiometric pressure transducer.
1 Packard connector.
1 three-way connector.

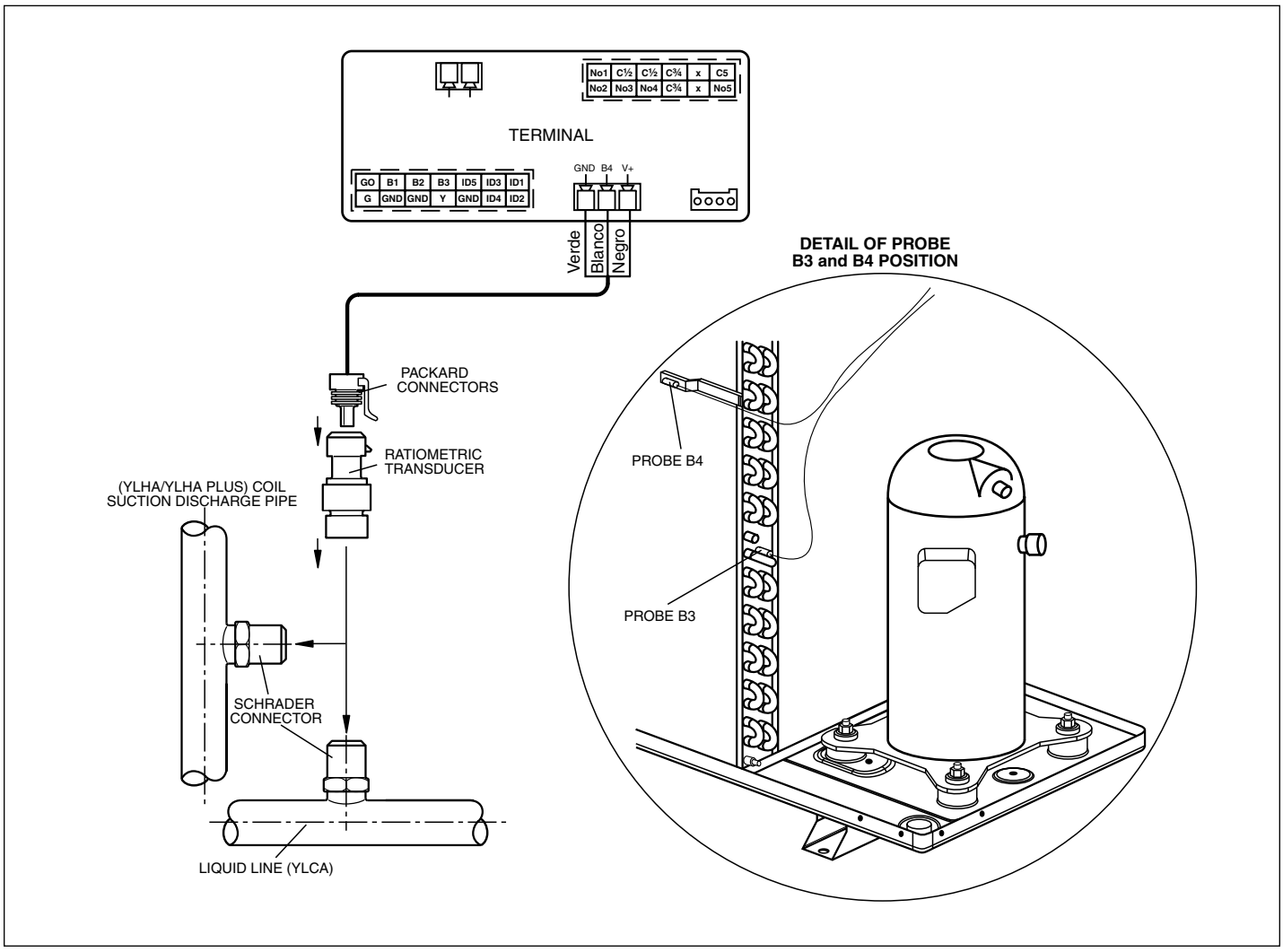
Attention: Install the kit with power supply to the unit turned off.

Mounting the pressure transducer on the cooling circuit

Screw the ratiometric transducer on to the free Schrader valve located in the suction/discharge pipe of the YLHA coil, or in the liquid line (YLCA). Check for leaks.

Mounting the Packard connector

Connect the three Packard connector cables to the three-way connector and at the regulator module in the order and position indicated below.



Disconnection of probe B3

Disassemble and disconnect from the connecting strip of probe B3 located in the coil (condensation/evaporation control).

Replacing outdoor probe B4

Disconnect outdoor probe B4 from the top of the control module and reconnect it to the same terminals probe B3 (GND-B3) was connected. With this change this probe becomes B3.

Connection the pressure transducer

Connect the pressure transducer to the same three-way connector that B4 was connected to, which is located at the back of the controller. Now the transducer becomes sensor B4.

Modifying parameters

- Power the system.
- Select the standby function on the regulator.
- Enter the parameter programming system by means of the password.
- Modify and check the following parameters in accordance with the values indicated: /03= 2; /04= 3; F05= 22.2; F06= 3.7; F07= 6.5; F08= 8.7; F09= 0.9; F10= 1.9; P18= 41.

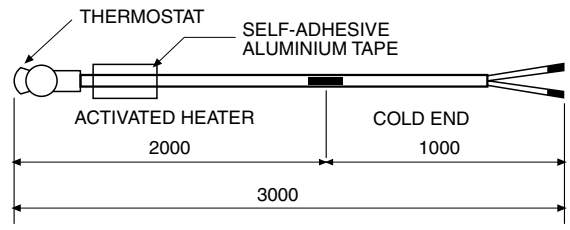
Turn the unit on and check operation.

Tray heater YLHA 5-15

This flexible cable heater can be used in cold climates to avoid the formation of ice and the consequent obstruction of the heat pump tray drain.

This accessory includes:
1 flexible cable heater with a thermostat
2 m. of 50 mm. self-adhesive aluminium tape

Characteristics of the heater
Current: 230-1-50
Power: 80 W
Total length: 3.000 mm.
Length of the heater activated: 2.000 mm. (contact with the tray)
Cold end: 1000 mm. (exposed cable and connection to the connecting strip)



Activating temperature of the heater: Indoor ambient at 4° C

Assembly

N1- With the power supply to the unit turned off, remove the front panel and the corner piece of the compressor chamber.

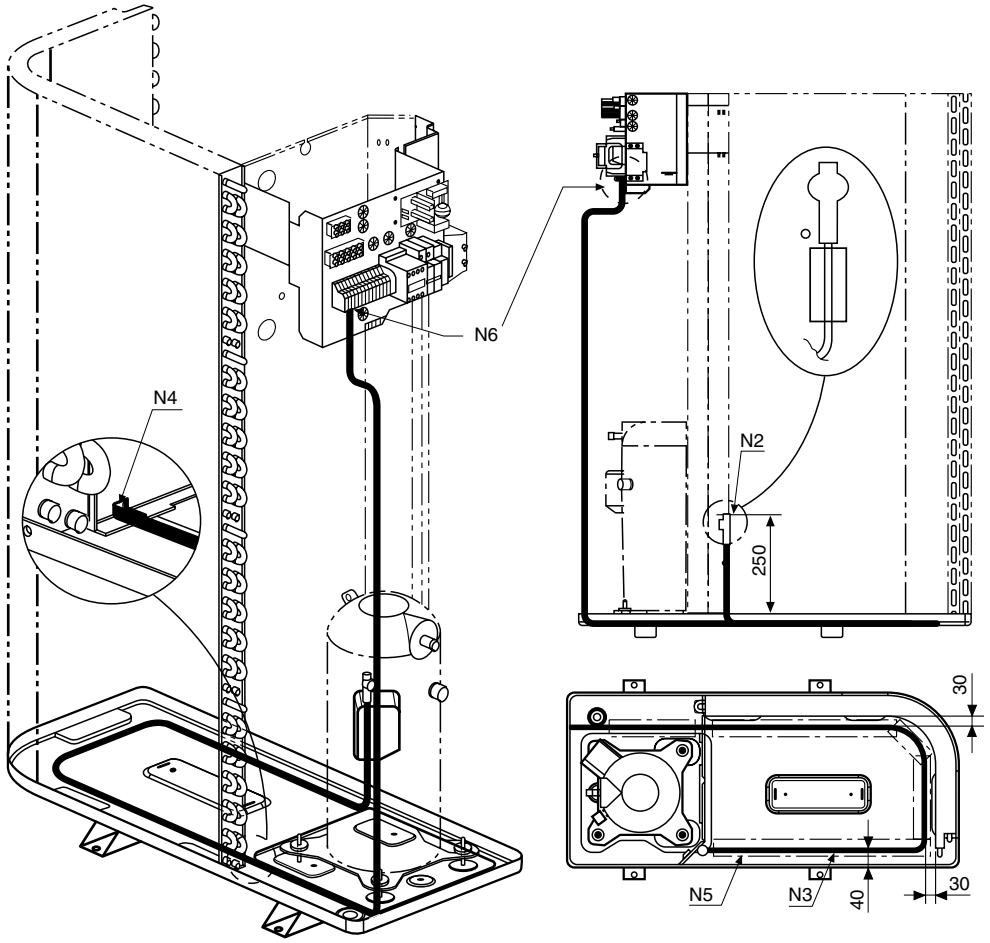
N2- Fasten the end with the thermostat to the separating panel of the fan chamber, at the indicated height. Use the 3.5 mm. Ø drilled hole as a point of reference.
To fasten said end, use the strip of self-adhesive tape that is inserted.

N3- Place the heater-cable on the tray, at the height indicated.

N4.- Pass the heater-cable to the compressor chamber through the rectangular hole in the base of the separator panel. Position the heater-cable until reaching the tray drain.

N5- Fasten the heater-cable to the tray with the self-adhesive aluminium tape included. Avoid covering the tray drain.

N6- Connect the two terminal cables of the heater to terminals L1 and N (230.1.50) on the connection connecting strip.



Soft Start

During the start-up process, the Scroll compressors use up a very high amperage to produce the magnetic field need to achieve the motor starting torque. This amperage loop is of short duration, but can reach from 5 to 8 times the normal operating amperage. As the motor accelerates, the amperage decreases until it reaches the nominal value. These starting loops cause interferences in the electric lines, and this could affect the units connected to same.

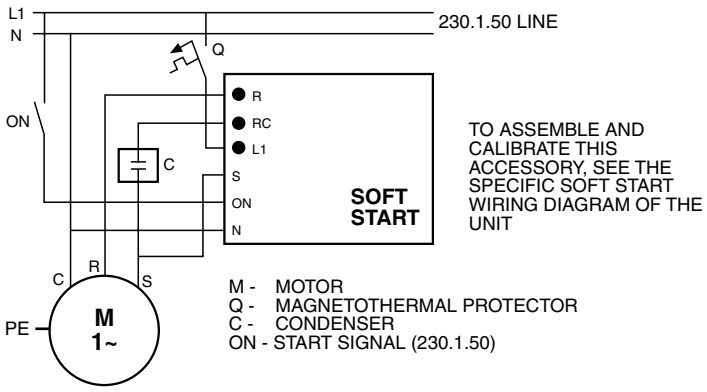
The Soft Start accessory comprises an electronic starter specially designed to limit the start amperage loop in single-phase Scroll compressors.

Characteristics

- Two models available:
  25 Amp (Models 5, 7 and 9)
  32 Amps (Model 12)
- Limitation of the start current to less than 45 Amps.
- Self-adjusting control. Needs no adjustment at the job site.
- Additional functions: Low voltage protection.
  Rotor blocking protection.
  Limitation of the number of starts.
- Substitutes the contactor.
- Specific design for Scroll compressors.

Operation

The starter should be connected to the signalling and power lines, as shown in the following diagram. When the ON contact of the signalling line closes, the control unit begins the start sequence, keeping the amperage at less than 45 amps. Meanwhile, it allows the motor to reach the sufficient torque for a safe start. Both in the start as well as the stopping of the motor, the thyristors withstand the motor current momentarily, thus avoiding overheating of the mechanical contacts.



Motor protection

Both the current as well as the amperage the motor is subjected to are monitored constantly by the starter, disconnecting the system in the following cases of emergency:

- The motor does not start in a 0.8-second interval.
  Example: The rotor is blocked.
- The amperage received by the system goes below 185 V for over 1 second.

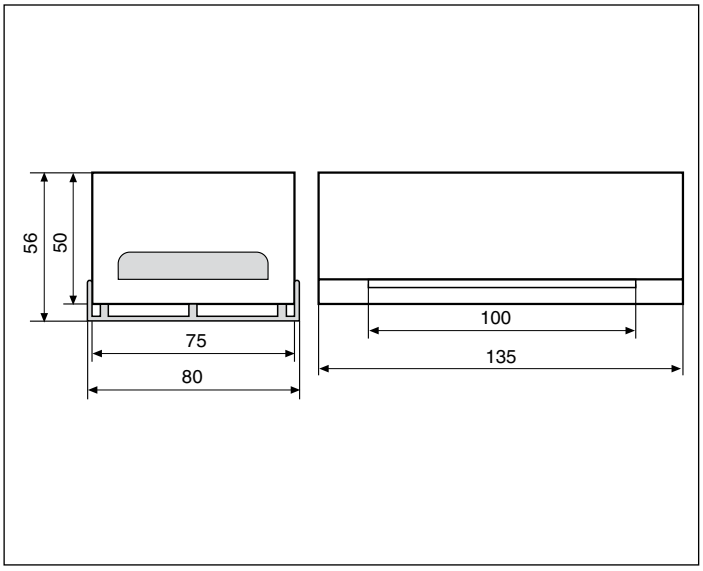
Timing function

The timing function protects the motor, allowing start-up of same after a minimum of 3 minutes off time. In the case of an emergency cut-out, this time is extended to 5 minutes so as to let the motor cool off.

Status indication

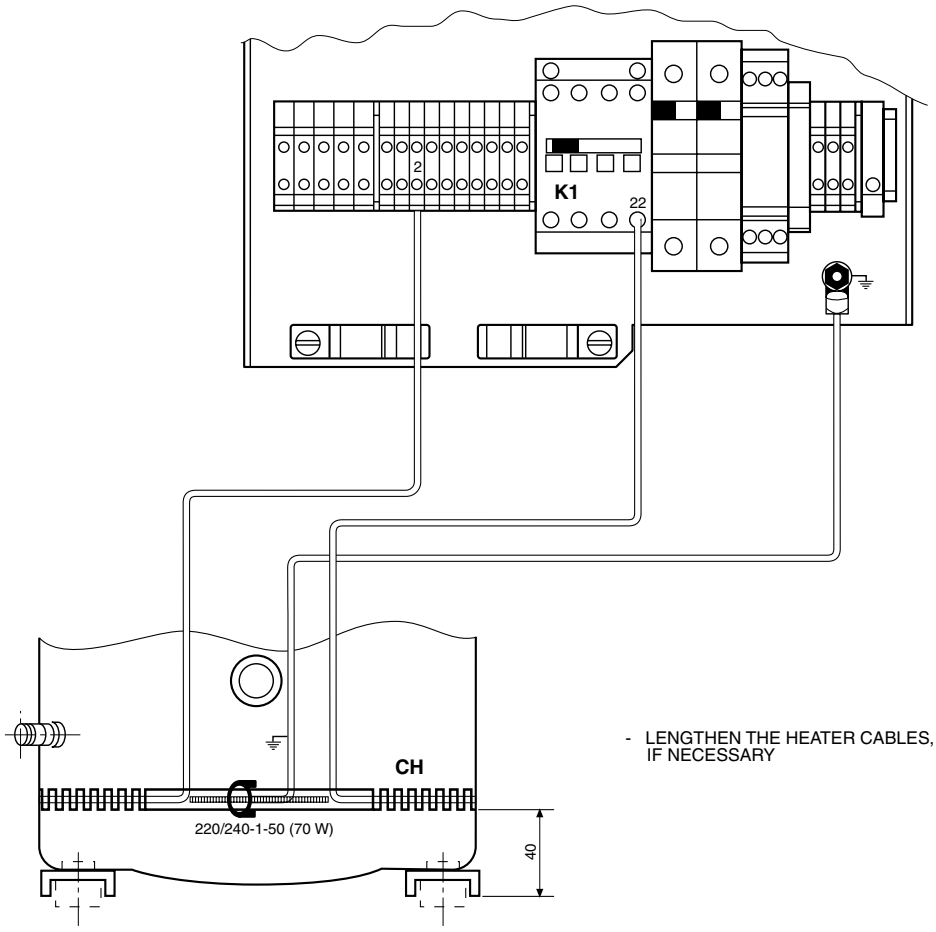
The starter status is indicated by the flashing frequency of a LED, and should be interpreted in accordance with the frequency codes printed on the control unit casing.

Dimensions

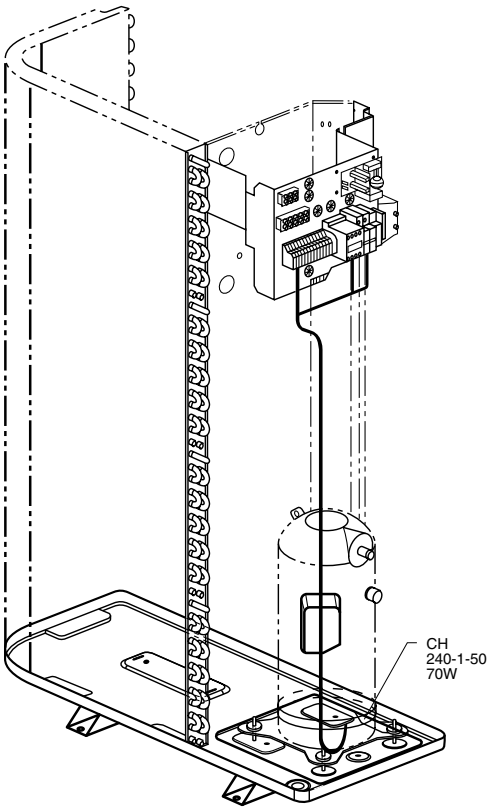


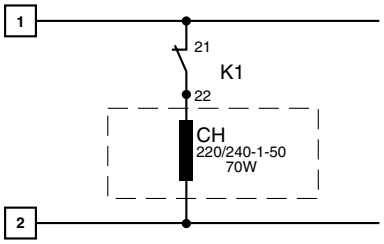
Compressor heater YLHA 5 - 15

Assembly



- LENGTHEN THE HEATER CABLES, IF NECESSARY





CH - COMPRESSOR HEATER
K1 - COMPRESSOR CONTACTOR

All data subject to change without notice.

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